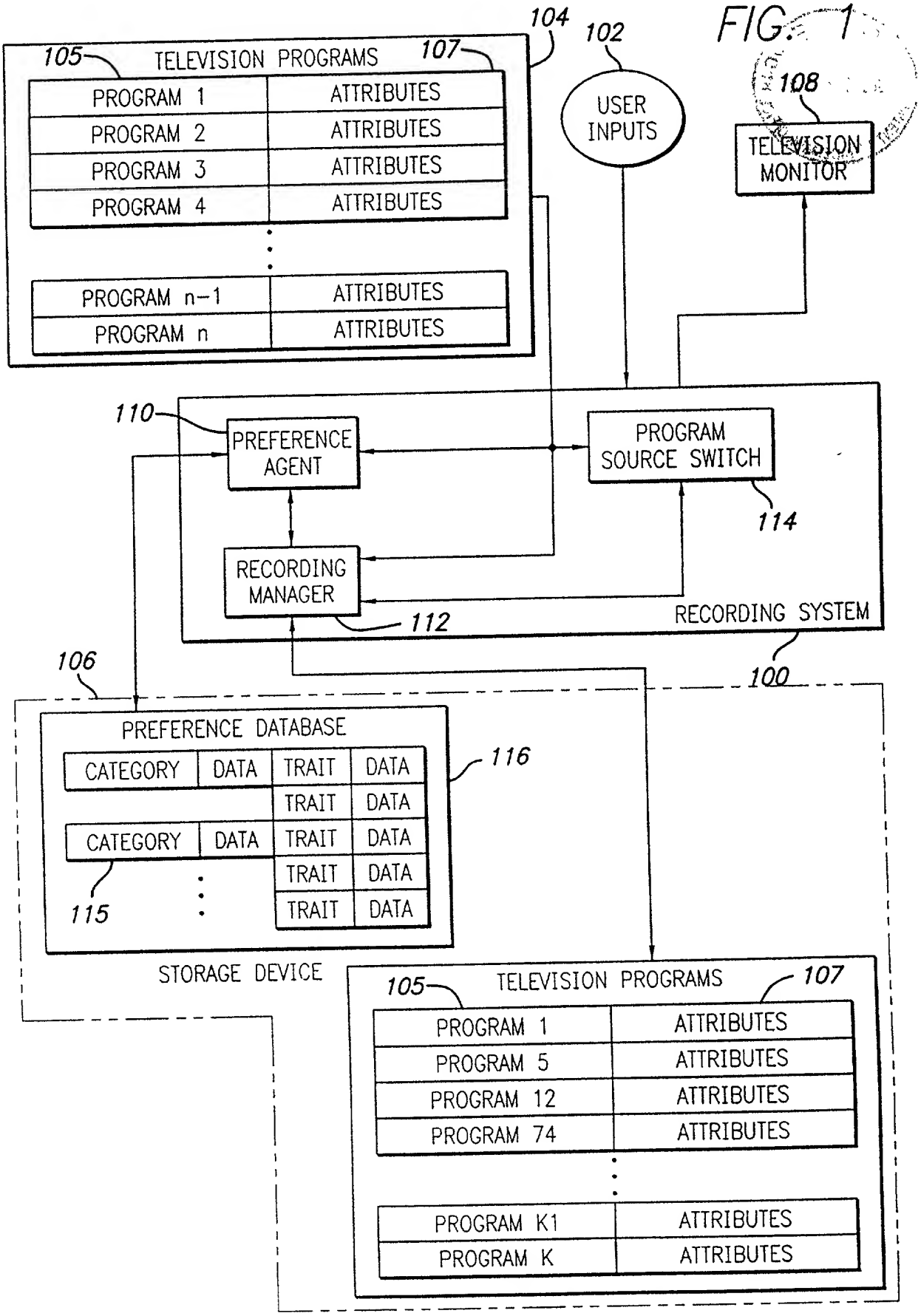
FIG. 1


104
102
105
TELEVISION PROGRAMS
107
PROGRAM 1
ATTRIBUTES
PROGRAM 2
ATTRIBUTES
PROGRAM 3
ATTRIBUTES
PROGRAM 4
ATTRIBUTES
PROGRAM n−1
ATTRIBUTES
PROGRAM n
ATTRIBUTES
USER INPUTS
108
TELEVISION MONITOR
110
PREFERENCE AGENT
PROGRAM SOURCE SWITCH
114
RECORDING MANAGER
112
RECORDING SYSTEM
100
106
PREFERENCE DATABASE
CATEGORY
DATA
TRAIT
DATA
116
115
STORAGE DEVICE
105
TELEVISION PROGRAMS
107
PROGRAM 1
ATTRIBUTES
PROGRAM 5
ATTRIBUTES
PROGRAM 12
ATTRIBUTES
PROGRAM 74
ATTRIBUTES
PROGRAM K1
ATTRIBUTES
PROGRAM K

20020705E5660

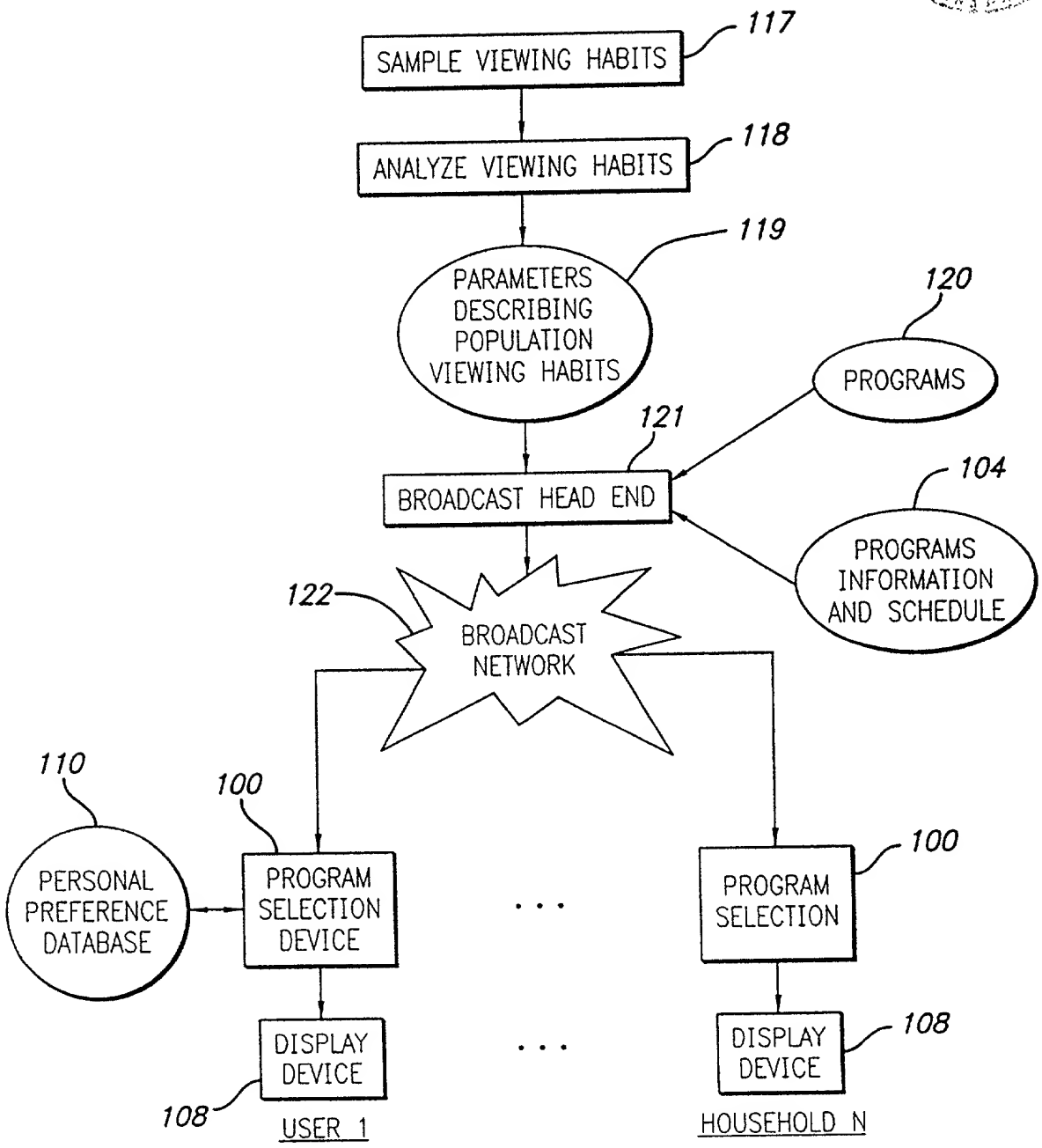


FIG. 2

EXAMPLES OF PROGRAM INFORMATION

EXAMPLE 1 (124)	EXAMPLE 2 (125)
TITLE=SEINFELD PROGRAM TYPE=SITCOM CATEGORY=COMEDY ACTORS=(ACTOR1, ACTOR2)	TITLE=US DEBT REPORT PROGRAM TYPE=NEWS ARTICLE CATEGORY=US GOVT. FINANCIAL PEOPLE MENTIONED=(BILL CLINTON, ALAN GREENSPAN)

FIG. 3

EXAMPLES FOR TRAITS (126)	EXAMPLES FOR LIKING FOR VIEWER N (127)
MOVIE ADVENTURE SPORTS MAD ABOUT YOU DYNAMIC TRAIT 1 DYNAMIC TRAIT 2 NBC NEWS FRIDAY MOVIE PREMIER MAD ABOUT YOU	MOVIE=14 ADVENTURE=3 SPORTS=0.3 MAD ABOUT YOU=5 DYNAMIC TRAIT 1=3 DYNAMIC TRAIT 2=5 NBC NEWS=13 FRIDAY MOVIE=18 PREMIER MAD ABOUT YOU-15

FIG. 4

SOME SAMPLE VALUES FOR FIELDS IN TRAIT RECORD

TRAIT TYPE	TRAIT DESCRIPTION
STATIC	(NBC, "NEWS").
DYNAMIC	SUBSTRING("CIA")IN DESC.
ASSOCIATION	TITLE
GENERATED	

DISTRIBUTION	DISTRIBUTION PARAMETERS
NORMAL	MEAN=13, DEVIATION=2
EXPONENTIAL	
DEFINED TYPE 1	
DEFINED TYPE 2	

FIG. 11

20070-5656

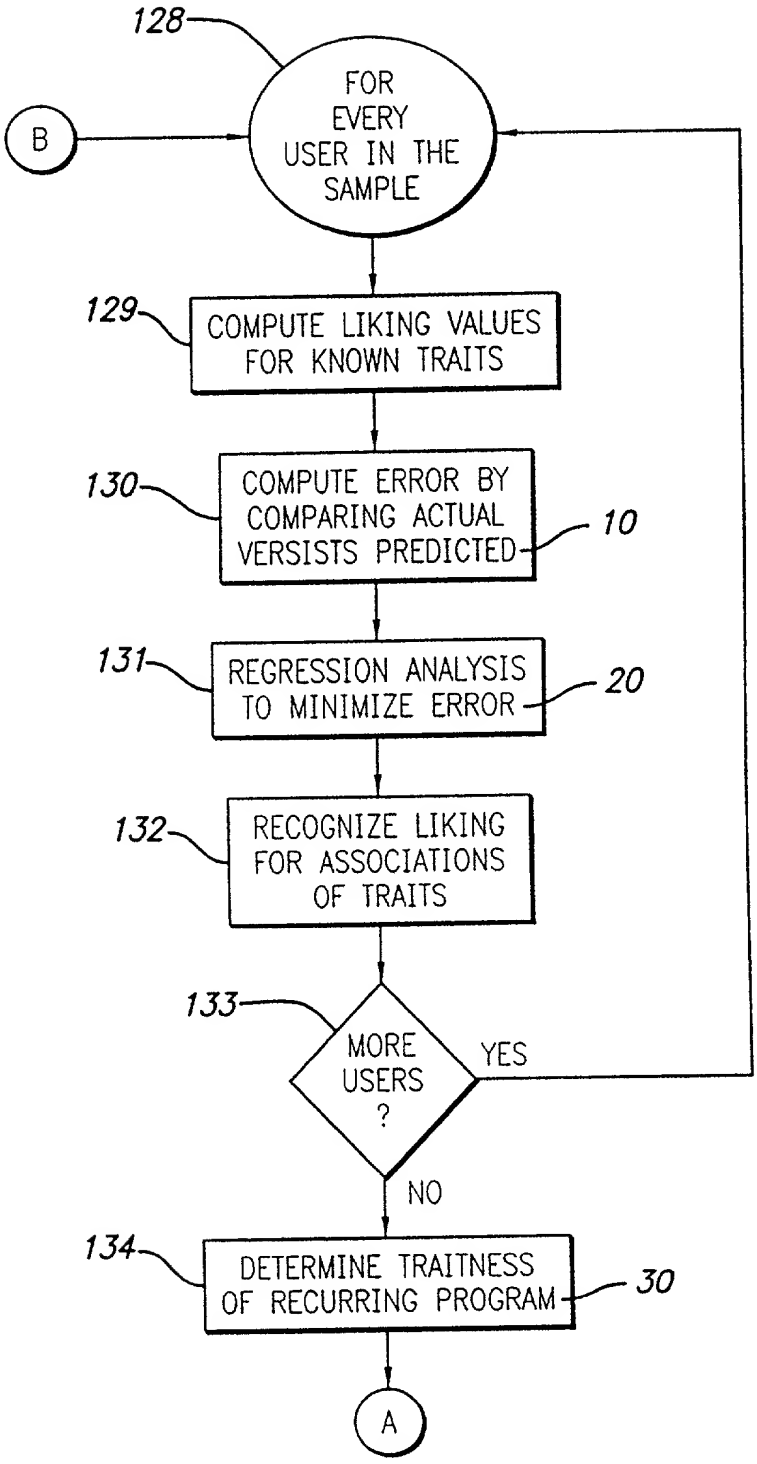

128
FOR EVERY USER IN THE SAMPLE
B
129
COMPUTE LIKING VALUES FOR KNOWN TRAITS
130
COMPUTE ERROR BY COMPARING ACTUAL VERSISTS PREDICTED
10
131
REGRESSION ANALYSIS TO MINIMIZE ERROR
20
132
RECOGNIZE LIKING FOR ASSOCIATIONS OF TRAITS
133
MORE USERS ?
YES
NO
134
DETERMINE TRAITNESS OF RECURRING PROGRAM
30
A

FIG. 5A

20060705553560

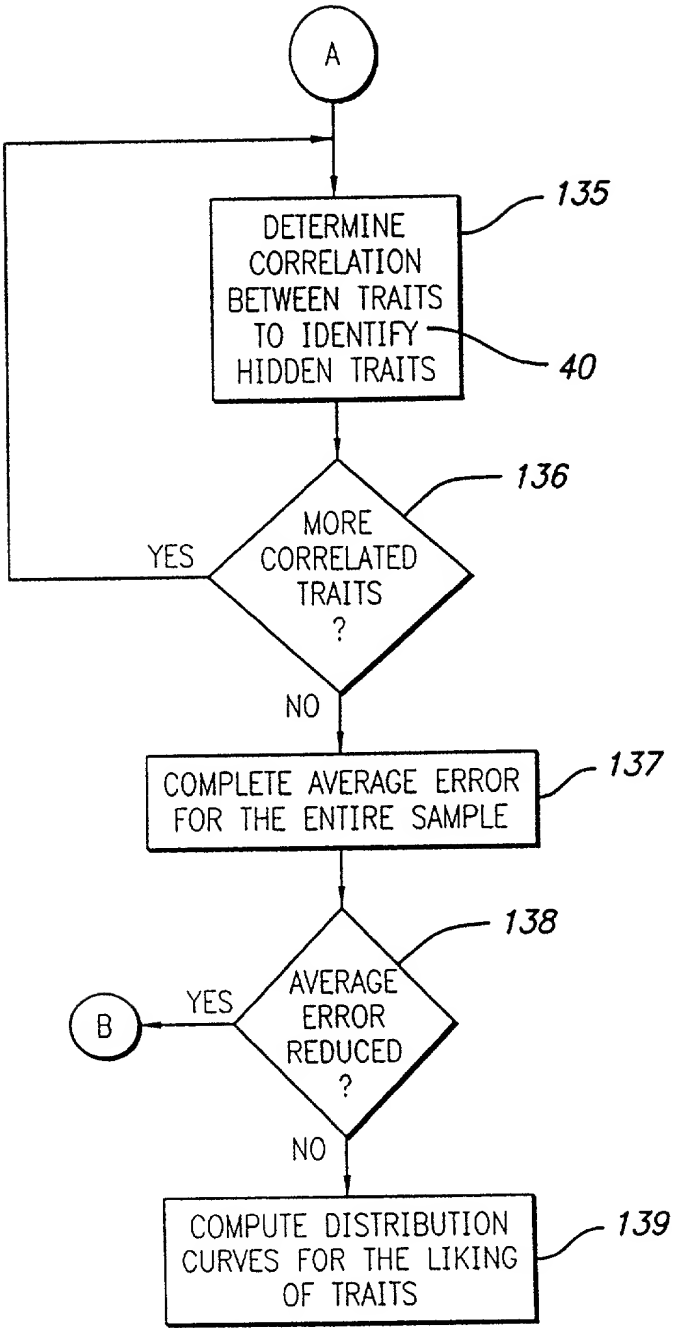


FIG. 5B

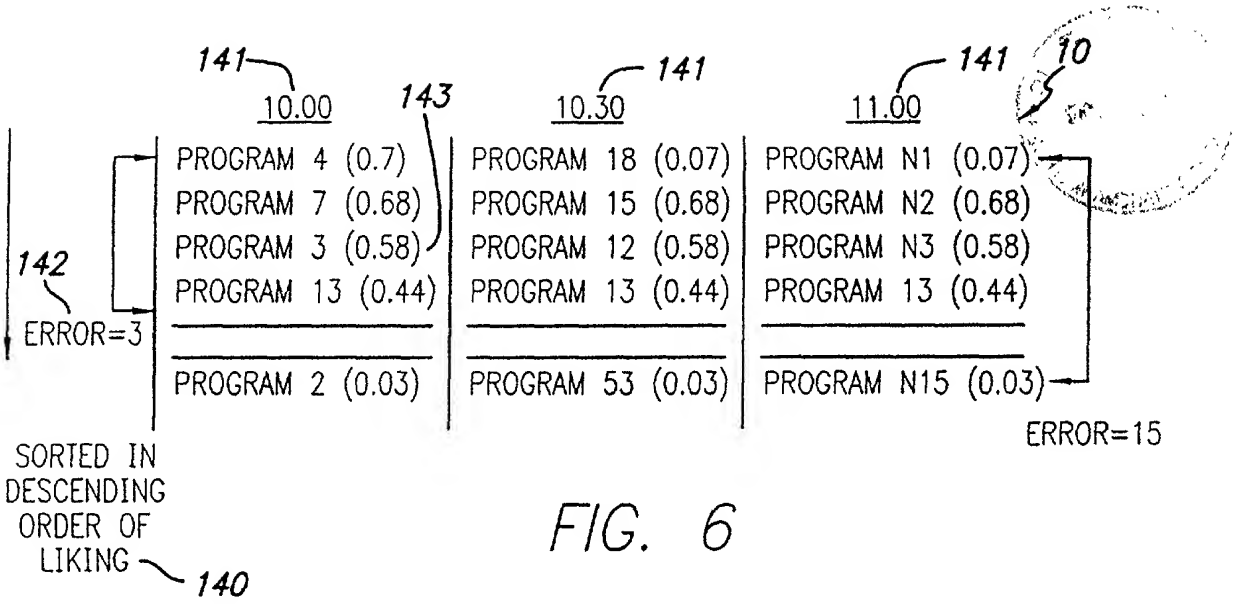

141
10.00
143
141
10.30
141
11.00
10
PROGRAM 4 (0.7)
PROGRAM 7 (0.68)
PROGRAM 3 (0.58)
PROGRAM 13 (0.44)
PROGRAM 2 (0.03)
PROGRAM 18 (0.07)
PROGRAM 15 (0.68)
PROGRAM 12 (0.58)
PROGRAM 13 (0.44)
PROGRAM 53 (0.03)
PROGRAM N1 (0.07)
PROGRAM N2 (0.68)
PROGRAM N3 (0.58)
PROGRAM 13 (0.44)
PROGRAM N15 (0.03)
142
ERROR=3
ERROR=15
SORTED IN DESCENDING ORDER OF LIKING
140

FIG. 6

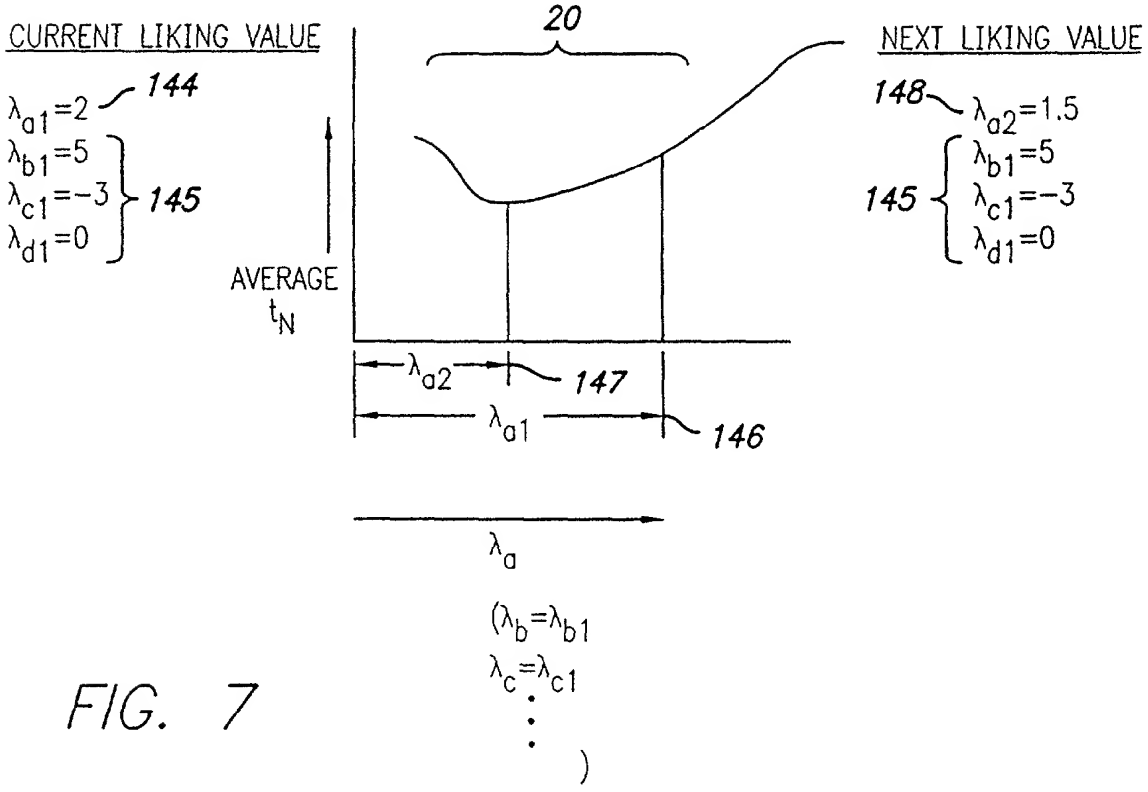

CURRENT LIKING VALUE
144
$\lambda_{a1}=2$
$\lambda_{b1}=5$
$\lambda_{c1}=-3$
$\lambda_{d1}=0$
145
20
NEXT LIKING VALUE
148
$\lambda_{a2}=1.5$
145
$\lambda_{b1}=5$
$\lambda_{c1}=-3$
$\lambda_{d1}=0$
AVERAGE t_N
λ_{a2}
147
λ_{a1}
146
λ_a
$(\lambda_b=\lambda_{b1}$
$\lambda_c=\lambda_{c1}$
:
)

FIG. 7

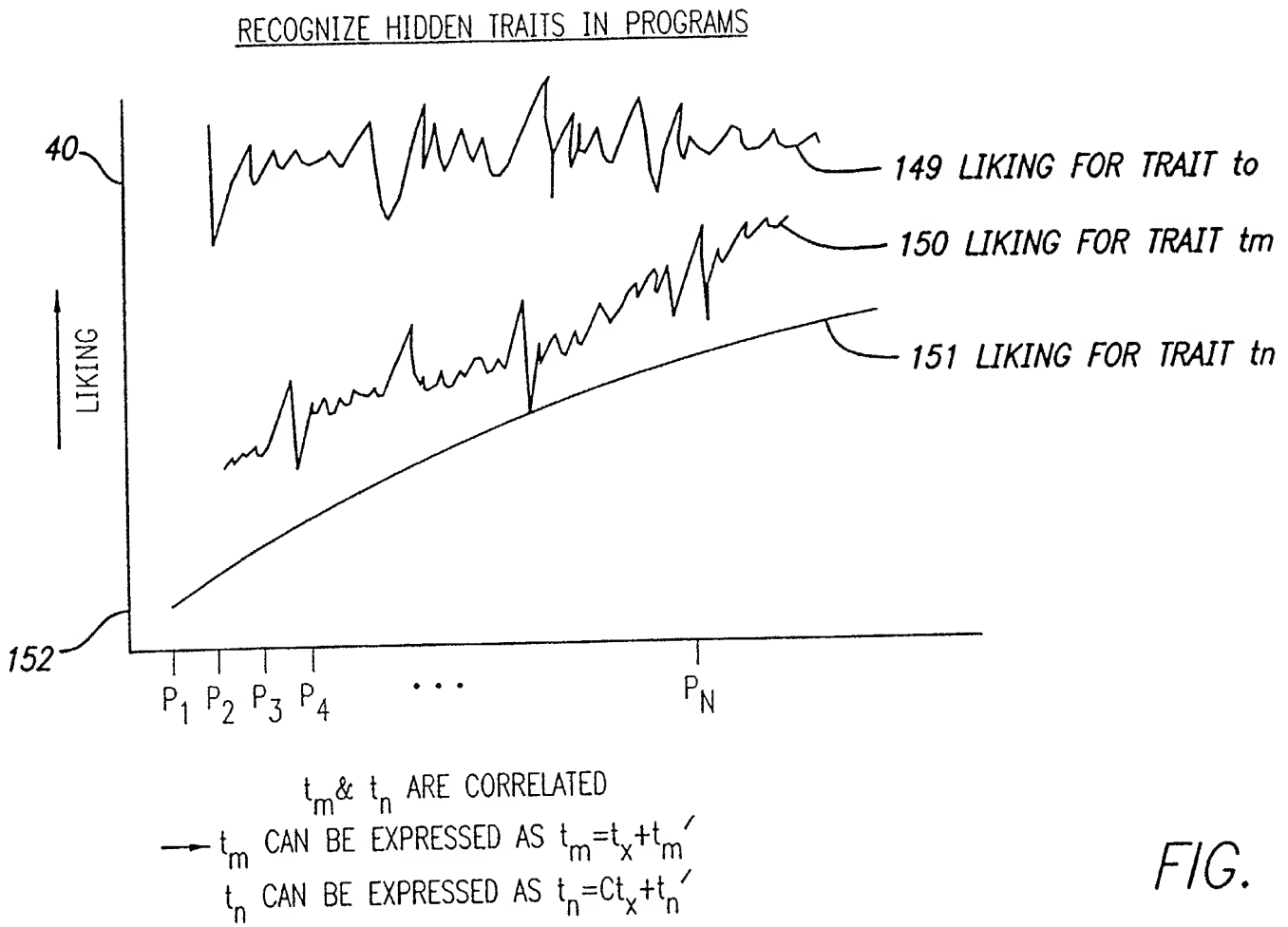

RECOGNIZE HIDDEN TRAITS IN PROGRAMS
40
LIKING
149 LIKING FOR TRAIT to
150 LIKING FOR TRAIT tm
151 LIKING FOR TRAIT tn
152
P1 P2 P3 P4 . . . PN
tm& tn ARE CORRELATED
tm CAN BE EXPRESSED AS tm=tx+tm'
tn CAN BE EXPRESSED AS tn=Ctx+tn'

FIG. 8

FIG. 9A

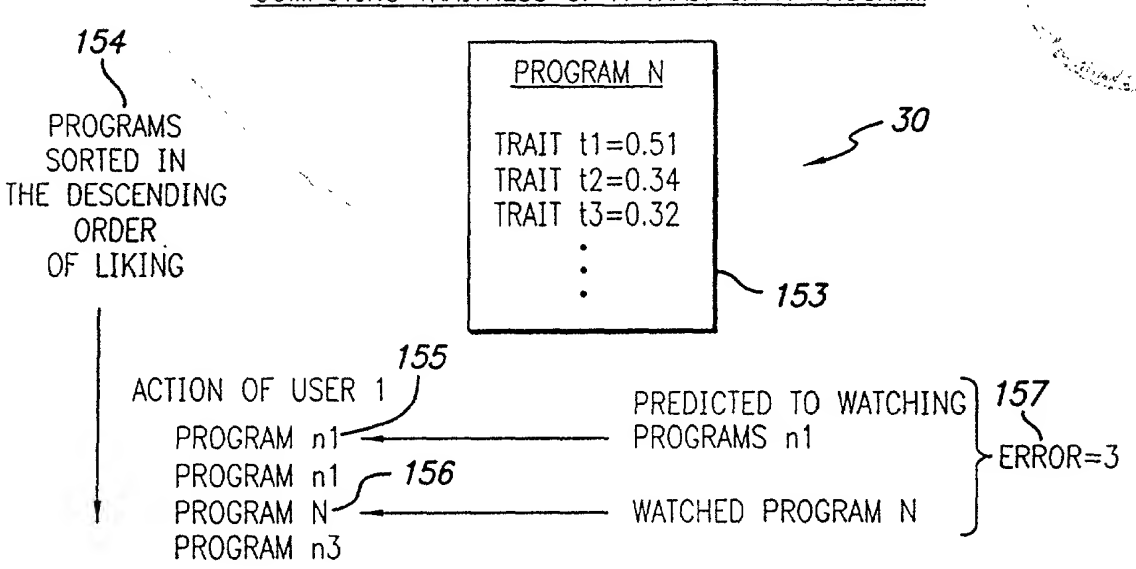
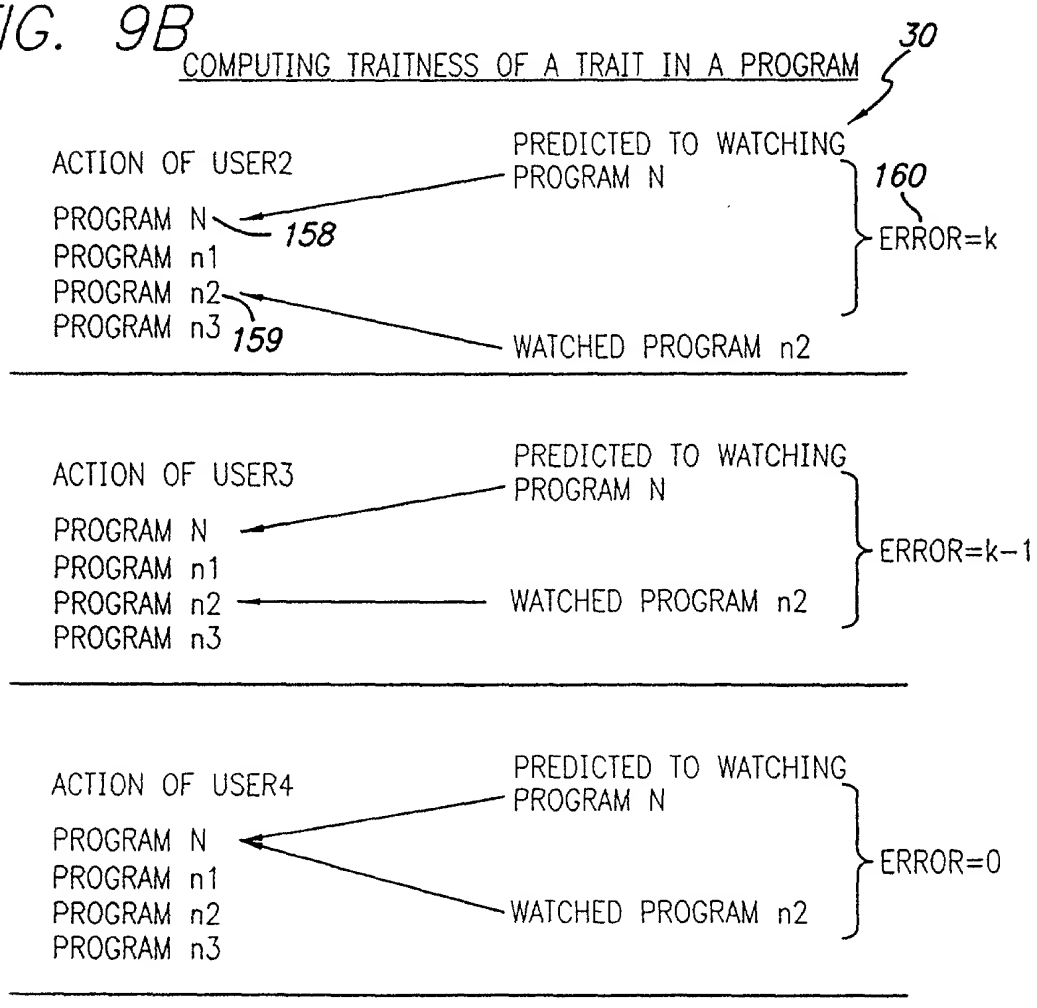


FIG. 9B



20050154556

COMPUTING TRAITNESS OF A TRAIT IN A PROGRAM

FIG. 9C

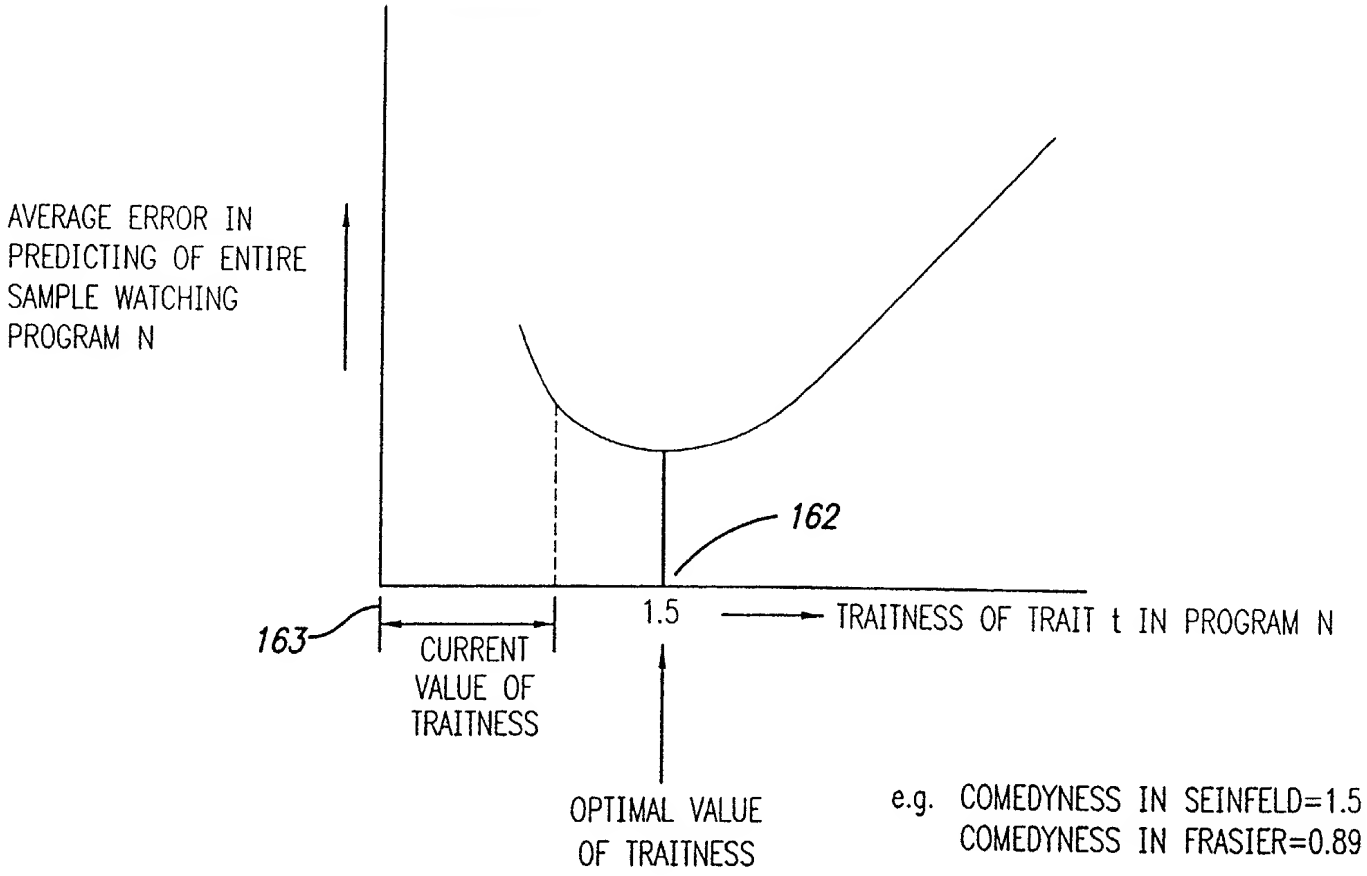


FIG. 10

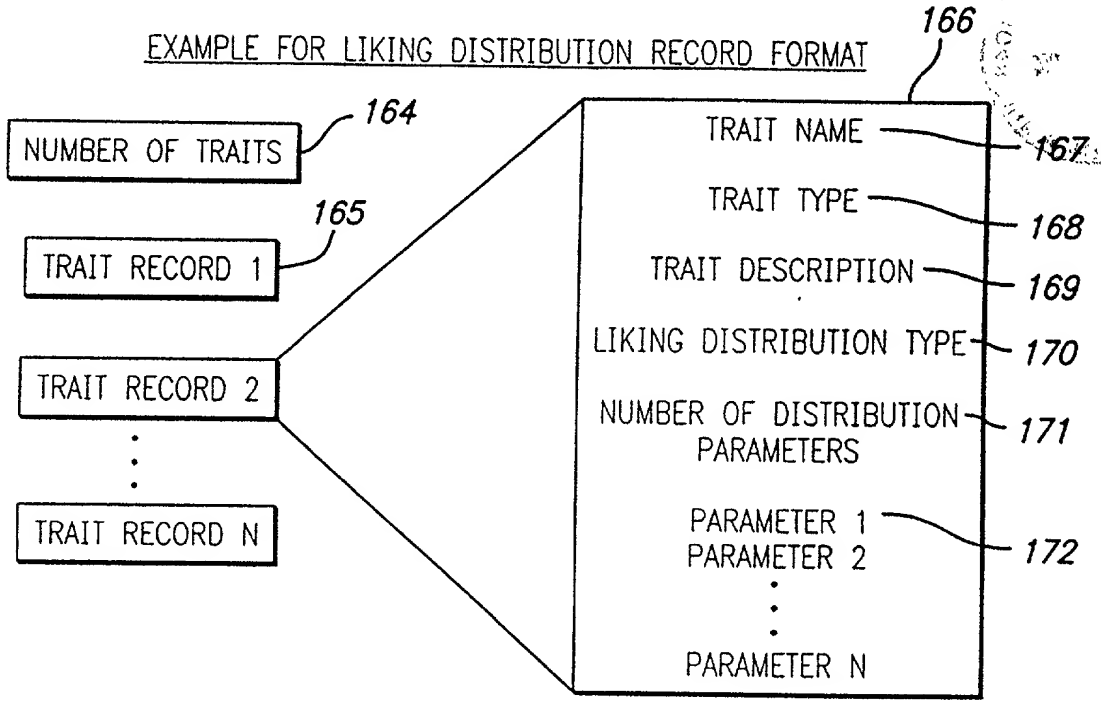

EXAMPLE FOR LIKING DISTRIBUTION RECORD FORMAT
166
NUMBER OF TRAITS
164
TRAIT RECORD 1
165
TRAIT RECORD 2
TRAIT RECORD N
TRAIT NAME
167
TRAIT TYPE
168
TRAIT DESCRIPTION
169
LIKING DISTRIBUTION TYPE
170
NUMBER OF DISTRIBUTION PARAMETERS
171
PARAMETER 1
PARAMETER 2
PARAMETER N
172

FIG. 12

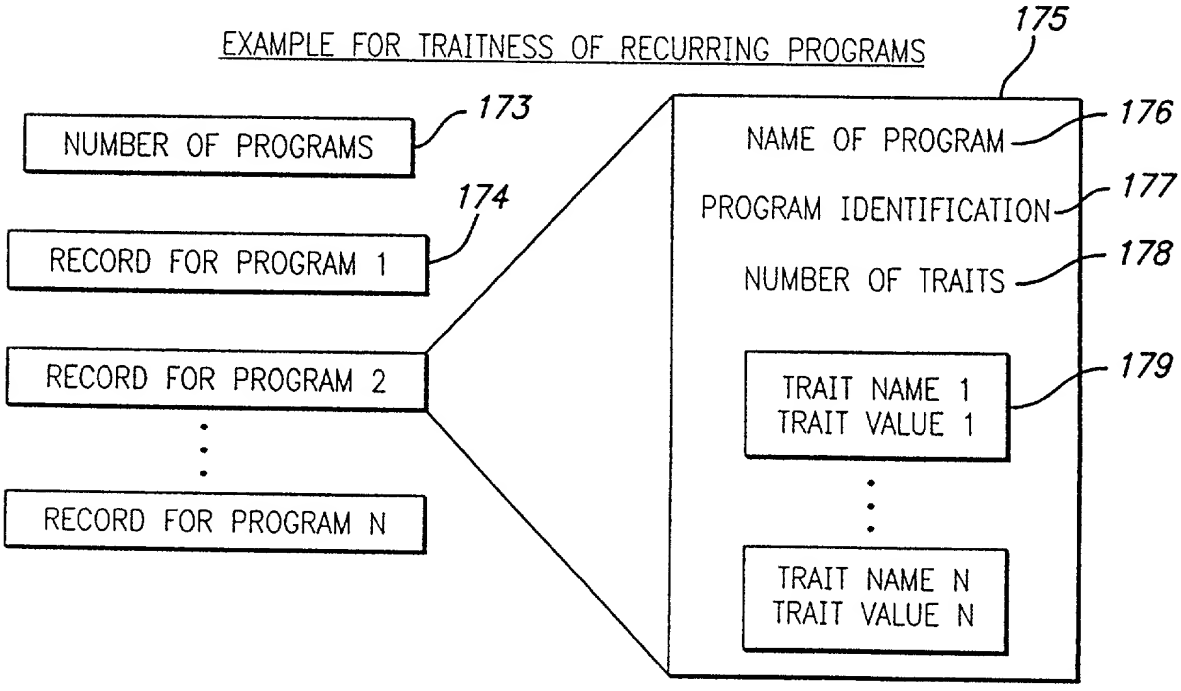

EXAMPLE FOR TRAITNESS OF RECURRING PROGRAMS
175
NUMBER OF PROGRAMS
173
RECORD FOR PROGRAM 1
174
RECORD FOR PROGRAM 2
RECORD FOR PROGRAM N
NAME OF PROGRAM
176
PROGRAM IDENTIFICATION
177
NUMBER OF TRAITS
178
TRAIT NAME 1
TRAIT VALUE 1
179
TRAIT NAME N
TRAIT VALUE N

FIG. 13

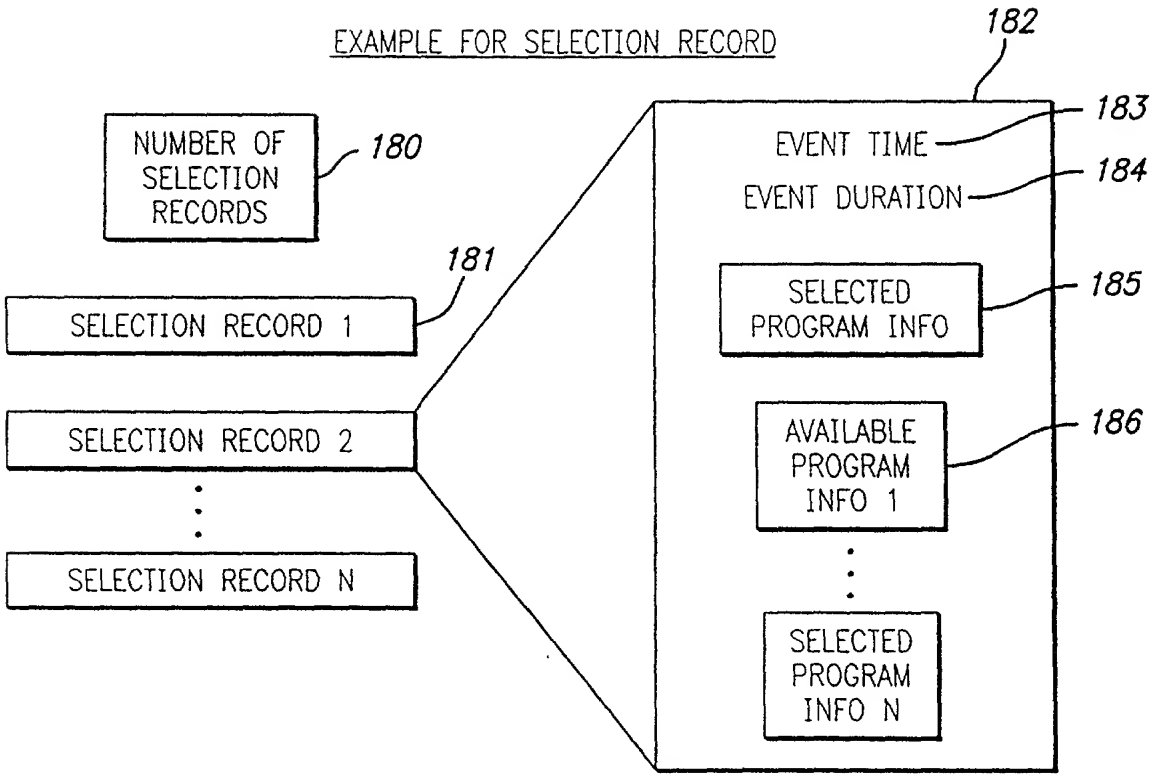
EXAMPLE FOR BROADCASTING TRAITNESS AS A PART OF EPG DATA

PROGRAM INFO

SEINFELD,
NBC,
COMEDY=0.07
SITCOM,
DYNAMIC TRAIT 1=0.1
⋮

ACTOR=SEINFELD

FIG. 14



20070525236

GENERATION OF USER SELECTION HISTORY

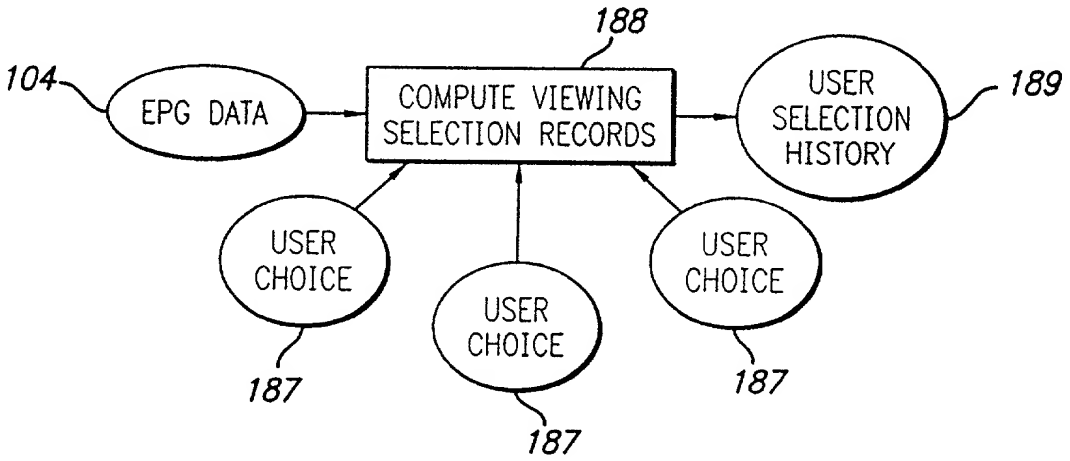


FIG. 15

COMPUTING RELEVANCE

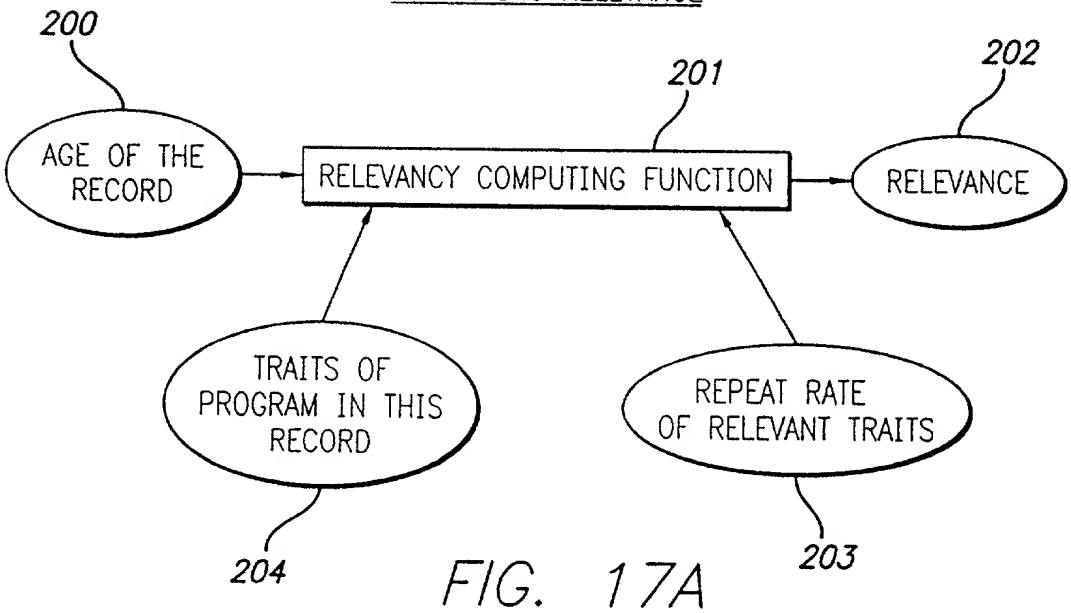
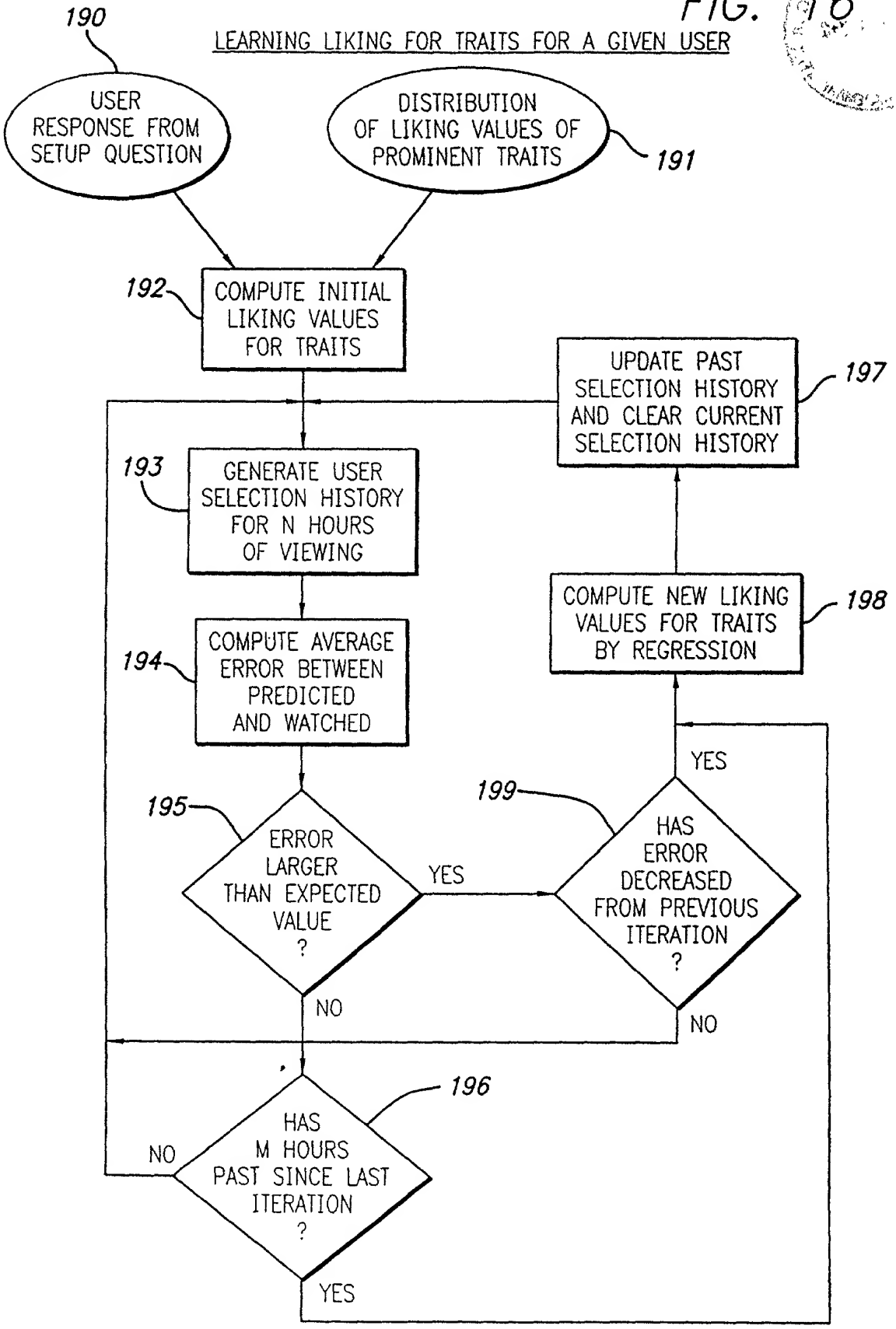


FIG. 17A

FIG. 16


190
LEARNING LIKING FOR TRAITS FOR A GIVEN USER
USER RESPONSE FROM SETUP QUESTION
DISTRIBUTION OF LIKING VALUES OF PROMINENT TRAITS
191
192
COMPUTE INITIAL LIKING VALUES FOR TRAITS
193
GENERATE USER SELECTION HISTORY FOR N HOURS OF VIEWING
194
COMPUTE AVERAGE ERROR BETWEEN PREDICTED AND WATCHED
195
ERROR LARGER THAN EXPECTED VALUE ?
YES
NO
199
HAS ERROR DECREASED FROM PREVIOUS ITERATION ?
YES
NO
196
HAS M HOURS PAST SINCE LAST ITERATION ?
NO
YES
197
UPDATE PAST SELECTION HISTORY AND CLEAR CURRENT SELECTION HISTORY
198
COMPUTE NEW LIKING VALUES FOR TRAITS BY REGRESSION

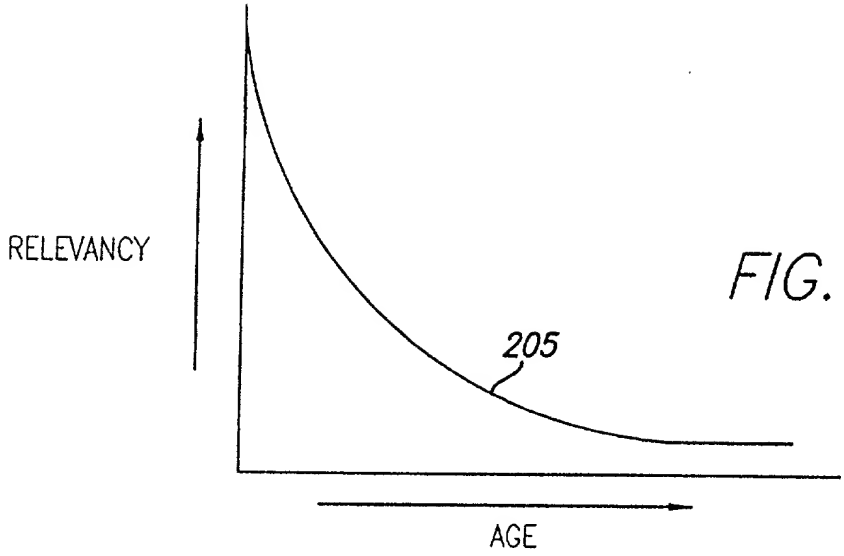


FIG. 17B

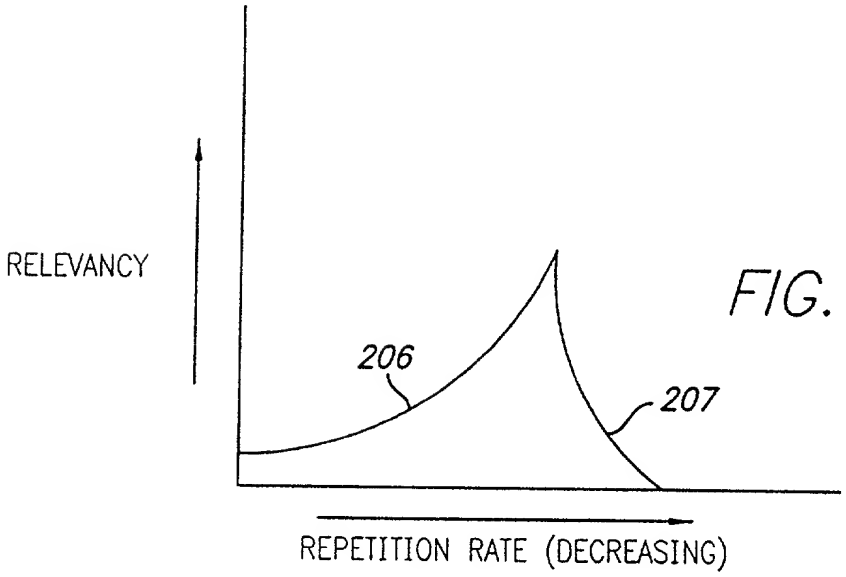


FIG. 17C

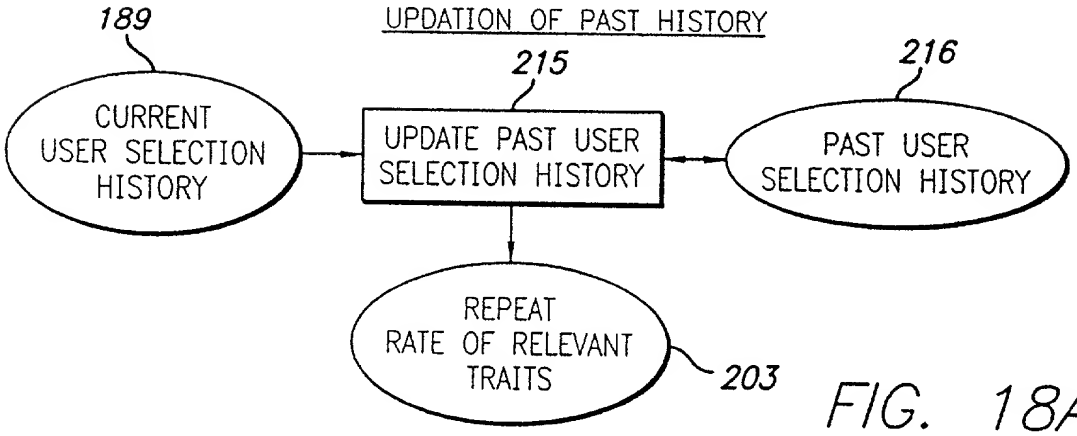


FIG. 18A

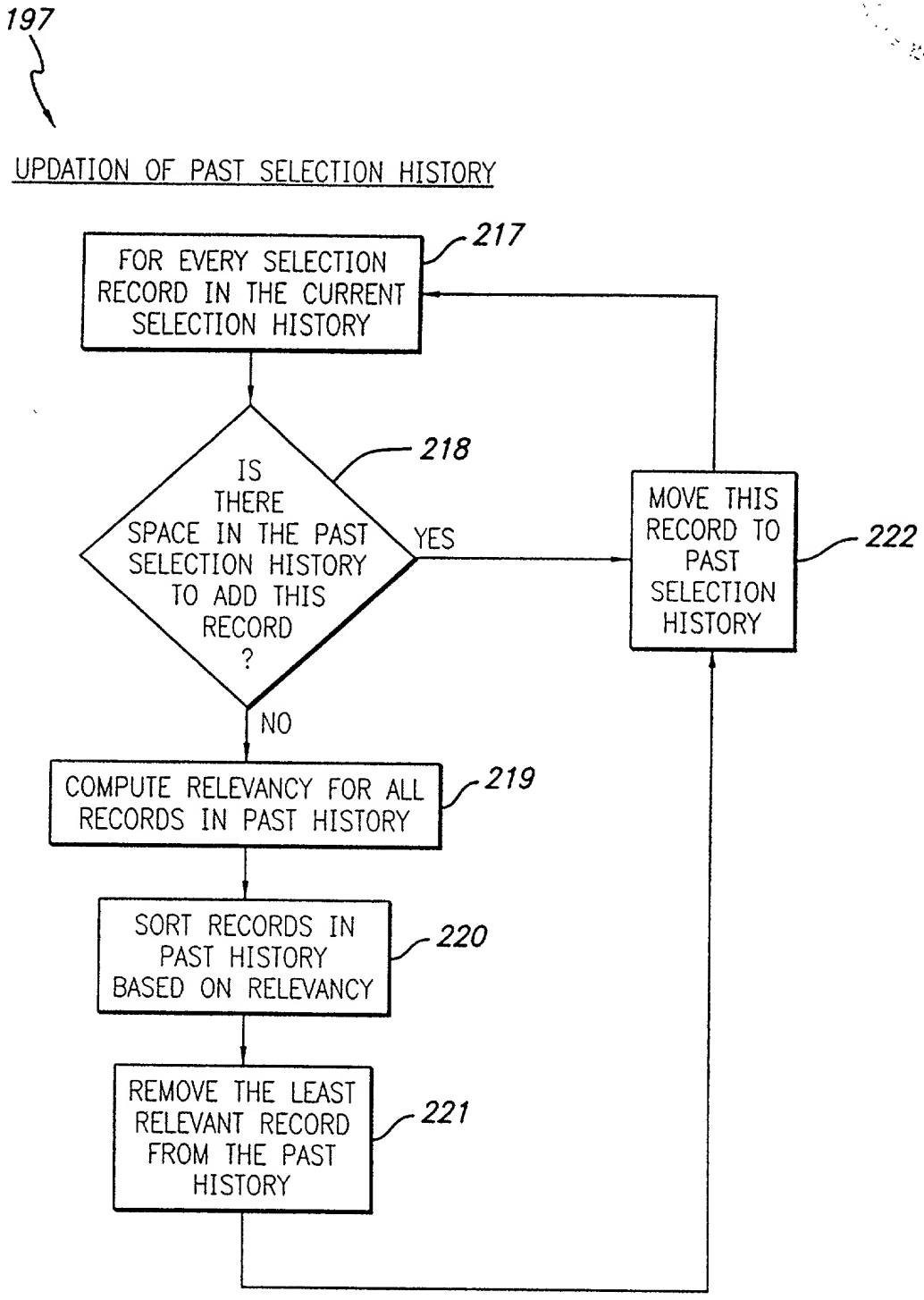

197
UPDATION OF PAST SELECTION HISTORY
FOR EVERY SELECTION RECORD IN THE CURRENT SELECTION HISTORY
217
IS THERE SPACE IN THE PAST SELECTION HISTORY TO ADD THIS RECORD ?
218
YES
NO
MOVE THIS RECORD TO PAST SELECTION HISTORY
222
COMPUTE RELEVANCY FOR ALL RECORDS IN PAST HISTORY
219
SORT RECORDS IN PAST HISTORY BASED ON RELEVANCY
220
REMOVE THE LEAST RELEVANT RECORD FROM THE PAST HISTORY
221

FIG. 18B

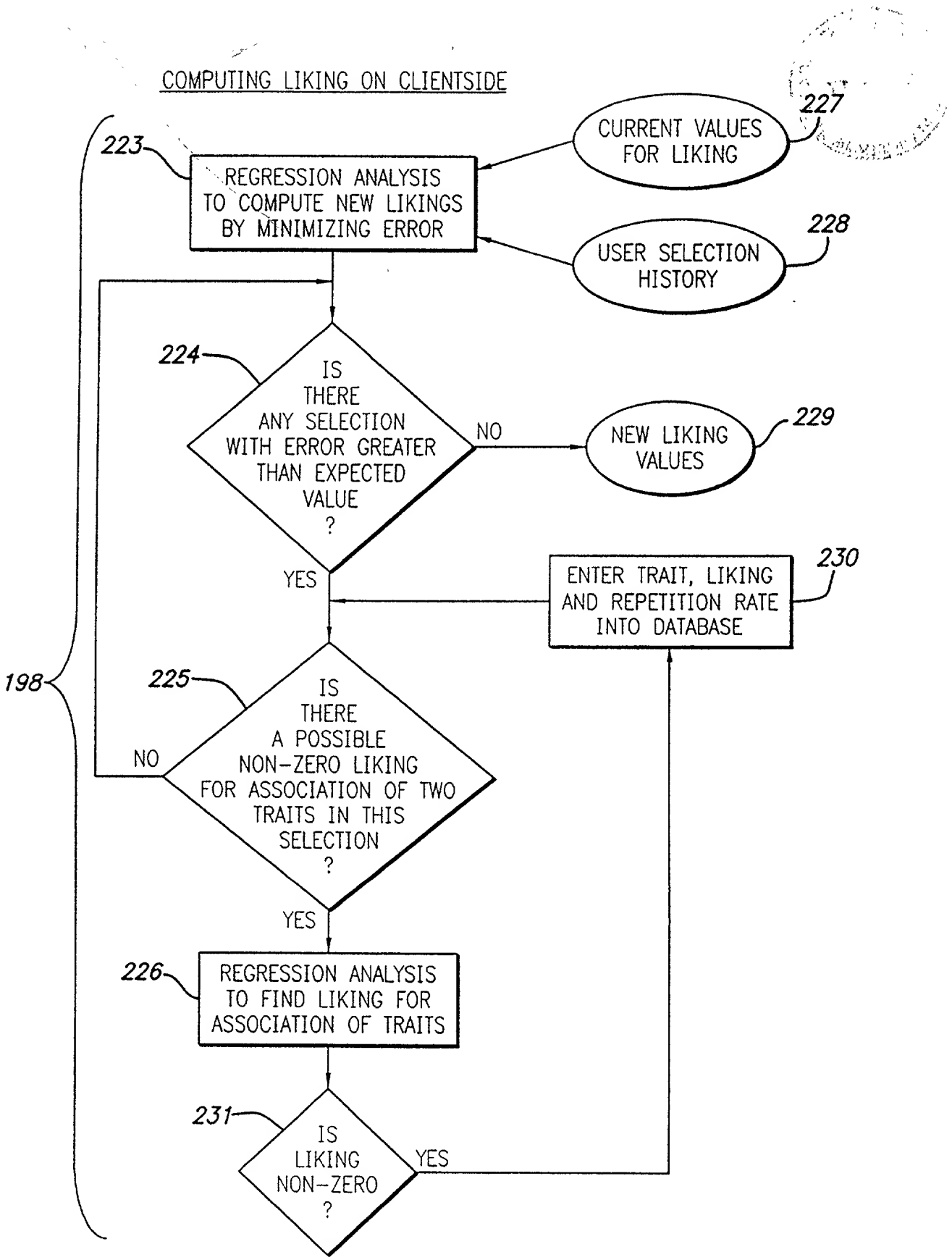

COMPUTING LIKING ON CLIENTSIDE
CURRENT VALUES FOR LIKING
227
223
REGRESSION ANALYSIS TO COMPUTE NEW LIKINGS BY MINIMIZING ERROR
USER SELECTION HISTORY
228
224
IS THERE ANY SELECTION WITH ERROR GREATER THAN EXPECTED VALUE ?
NO
NEW LIKING VALUES
229
YES
ENTER TRAIT, LIKING AND REPETITION RATE INTO DATABASE
230
198
225
IS THERE A POSSIBLE NON-ZERO LIKING FOR ASSOCIATION OF TWO TRAITS IN THIS SELECTION ?
NO
YES
226
REGRESSION ANALYSIS TO FIND LIKING FOR ASSOCIATION OF TRAITS
231
IS LIKING NON-ZERO ?
YES

FIG. 19

20020075600

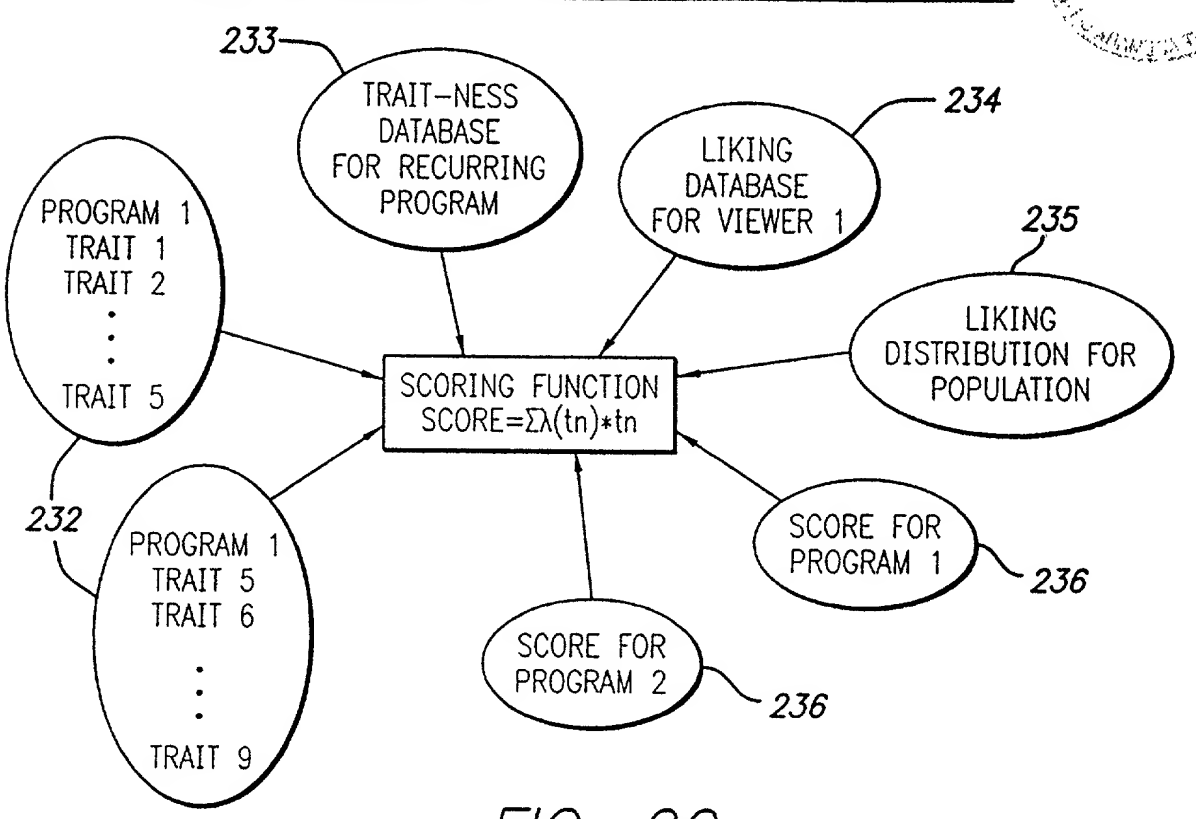


FIG. 20

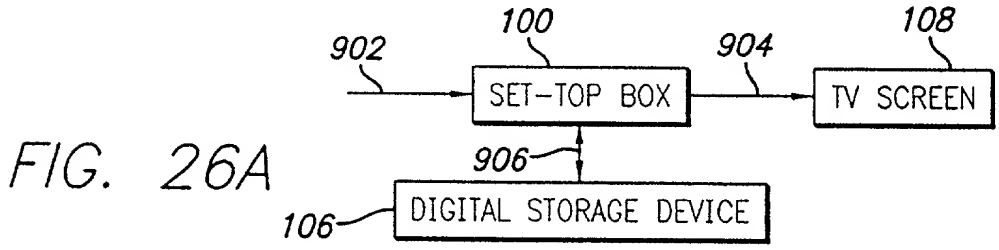


FIG. 26A

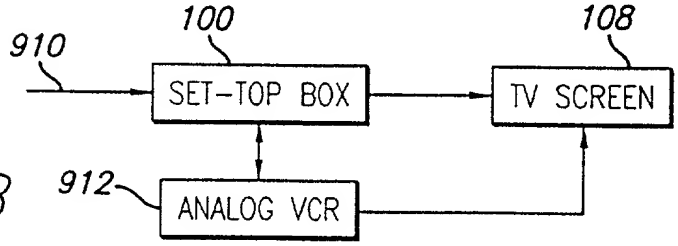
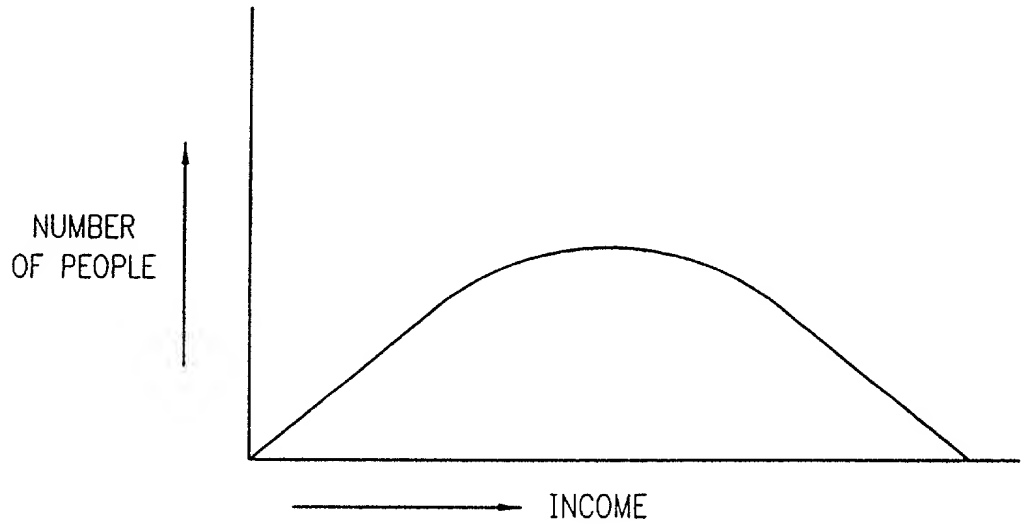


FIG. 26B

20000707 - 5E3E5660



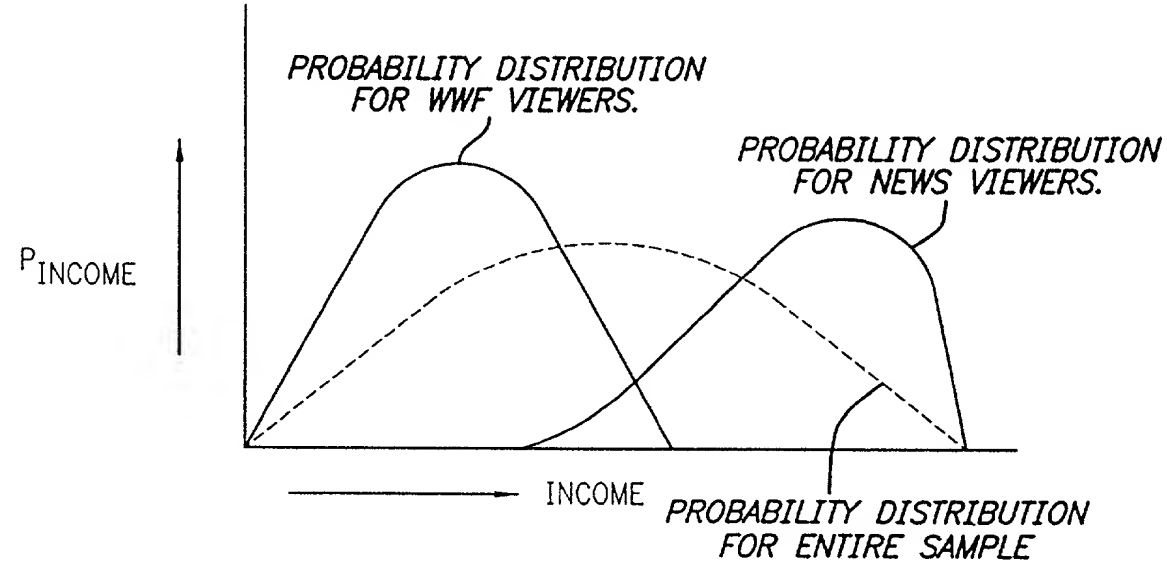
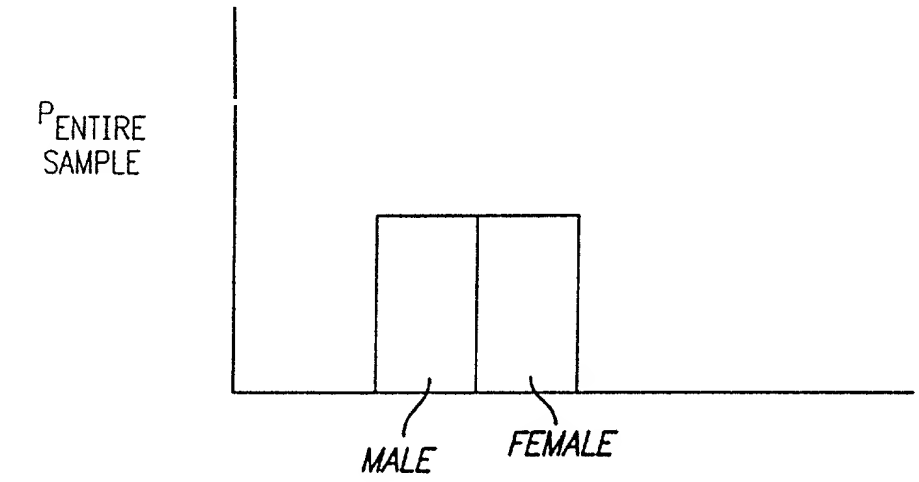
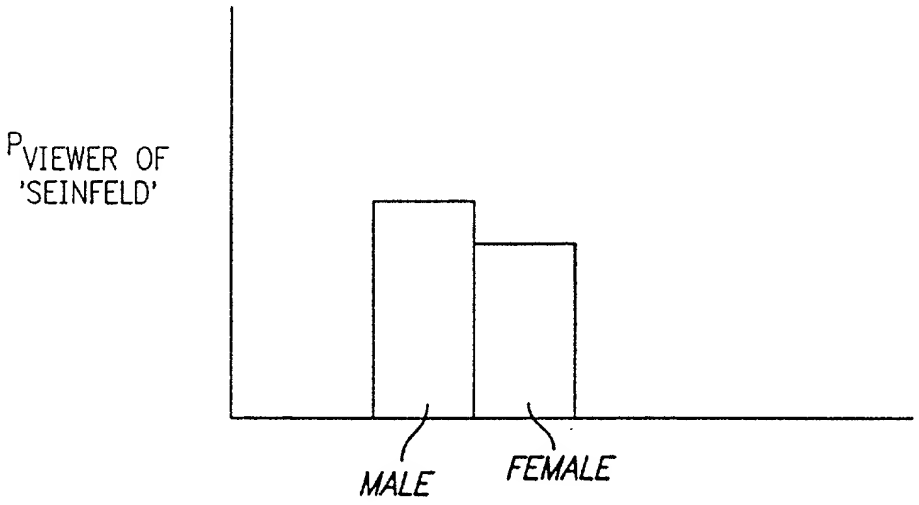


FIG. 21A

20020070-5EE5960





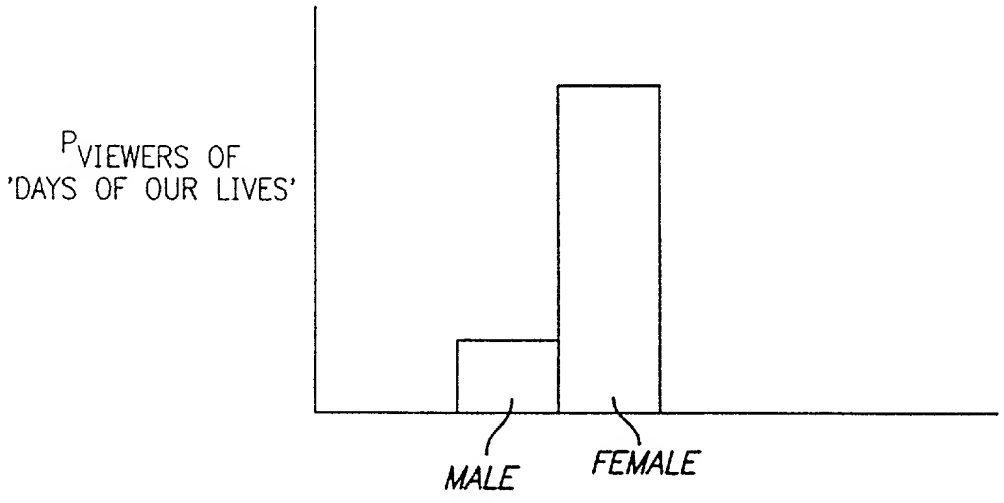


FIG. 21B

20070135660

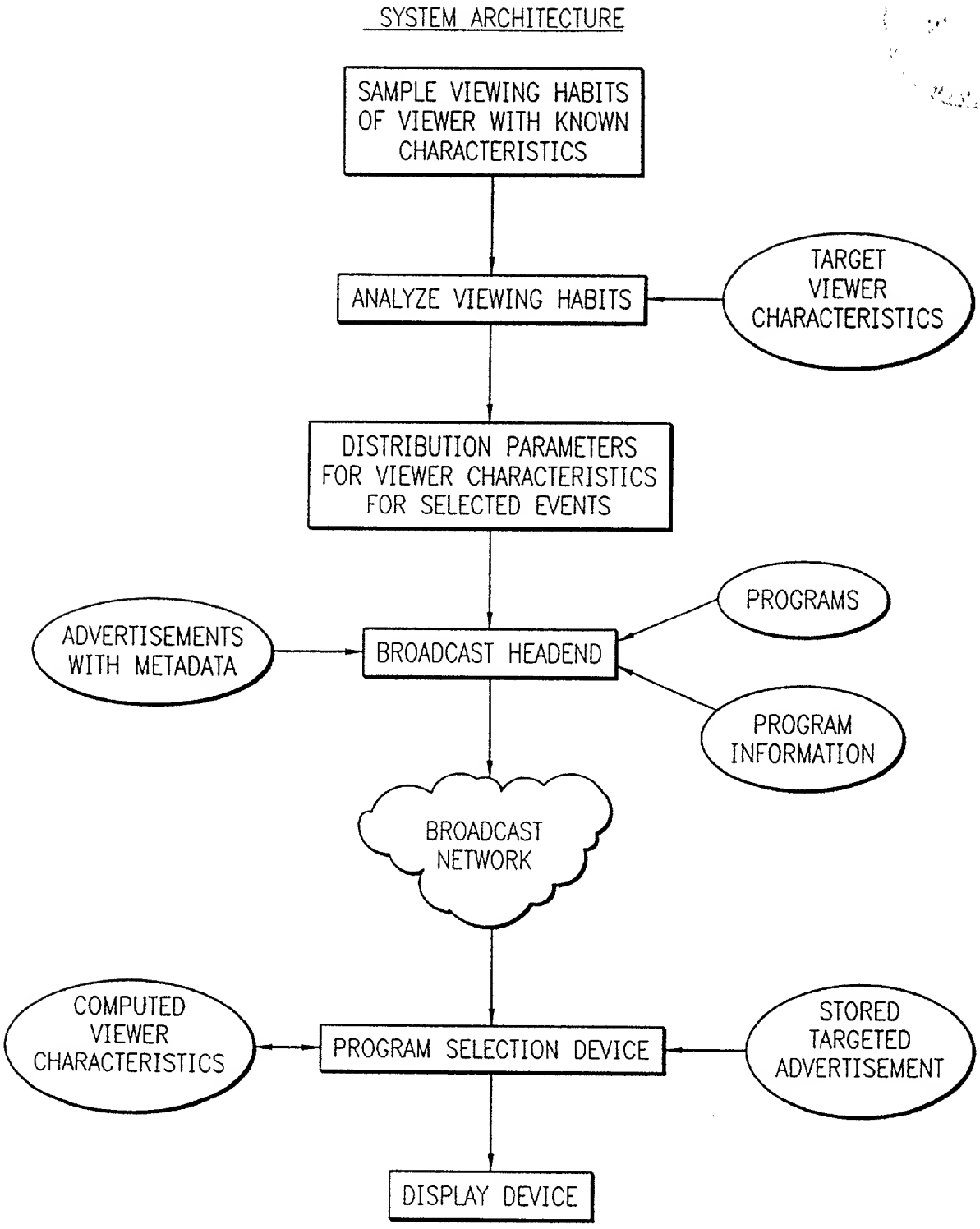


FIG. 22

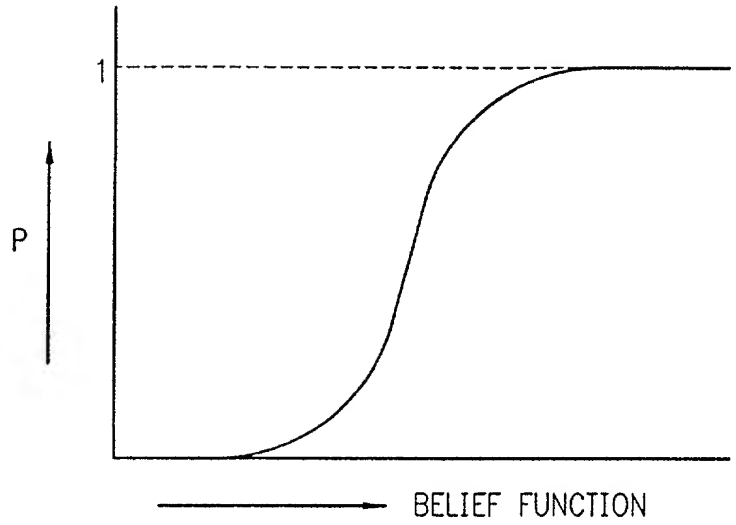


FIG. 23A

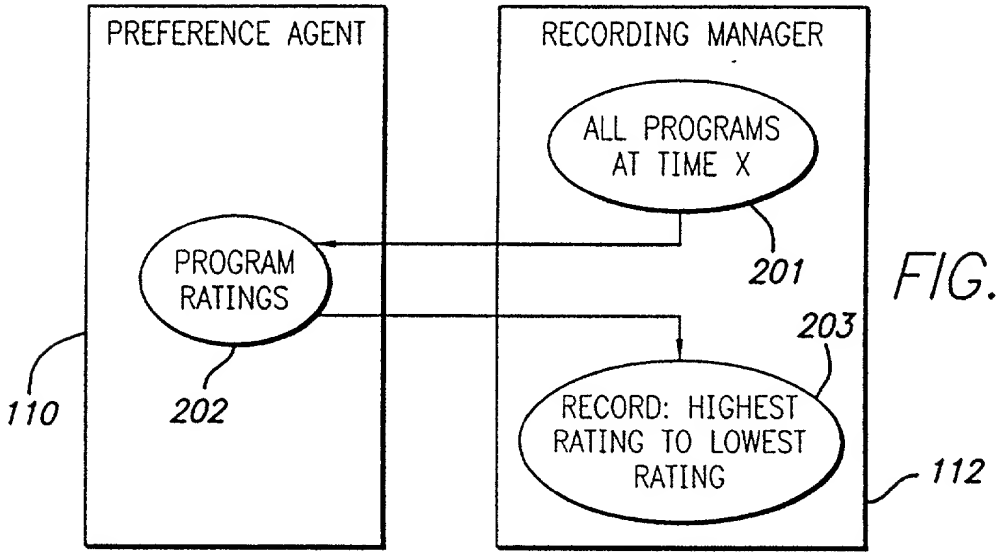


FIG. 24

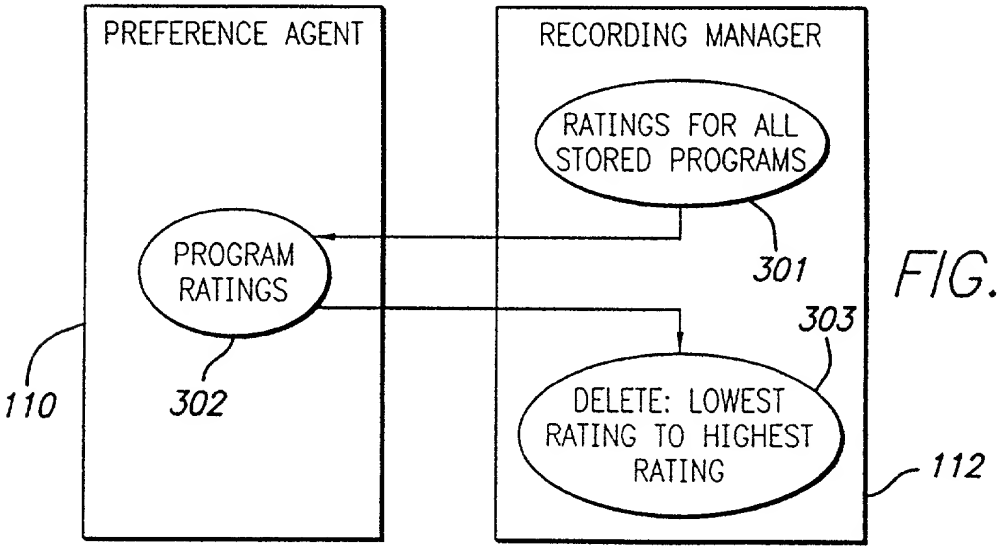


FIG. 25

20060706:135550

DEMOGRAPHIC TRAIT RECORD FORMAT

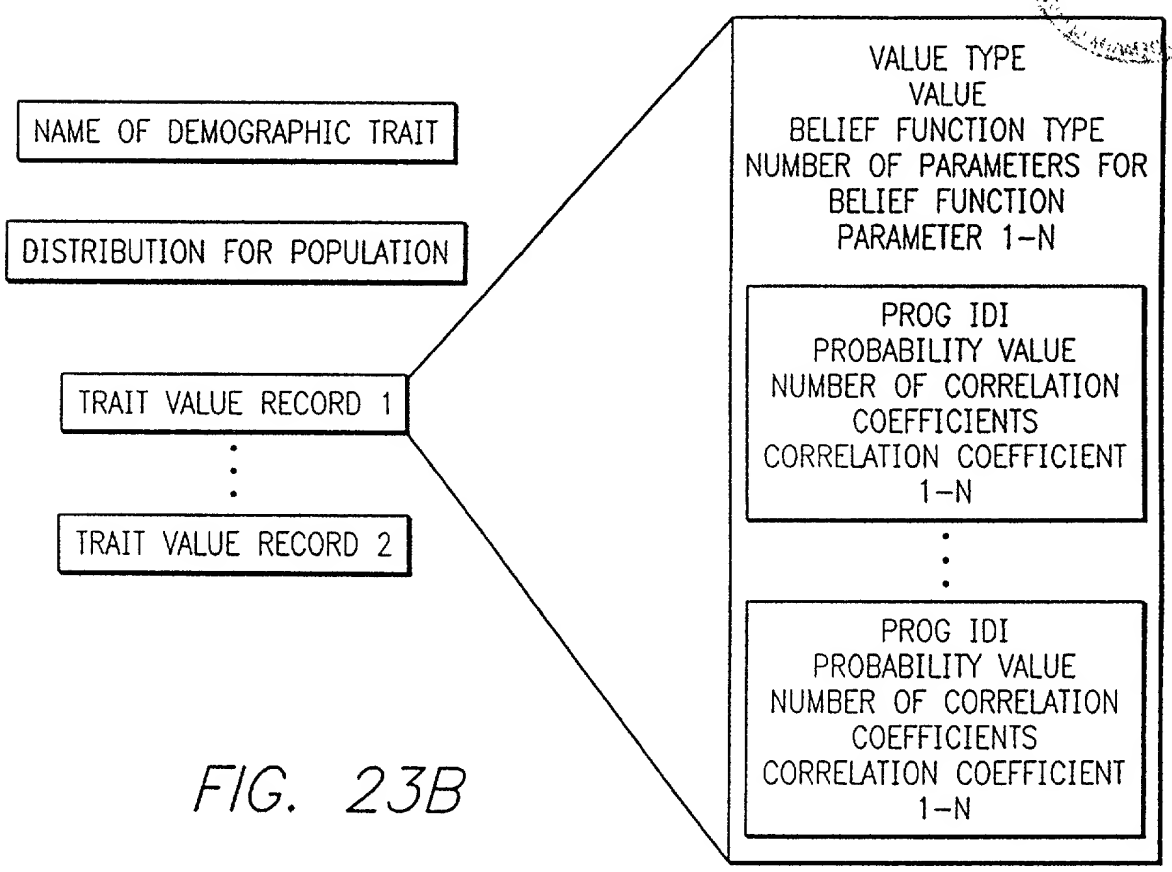


FIG. 23B

ADVERTISEMENT TARGETING RECORD FORMAT

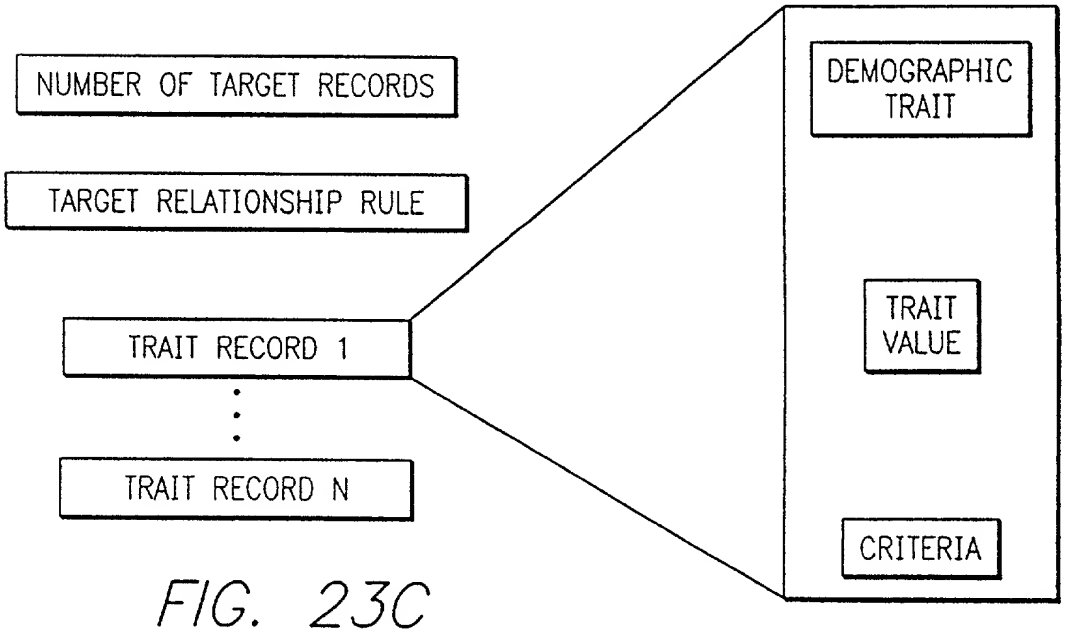


FIG. 23C

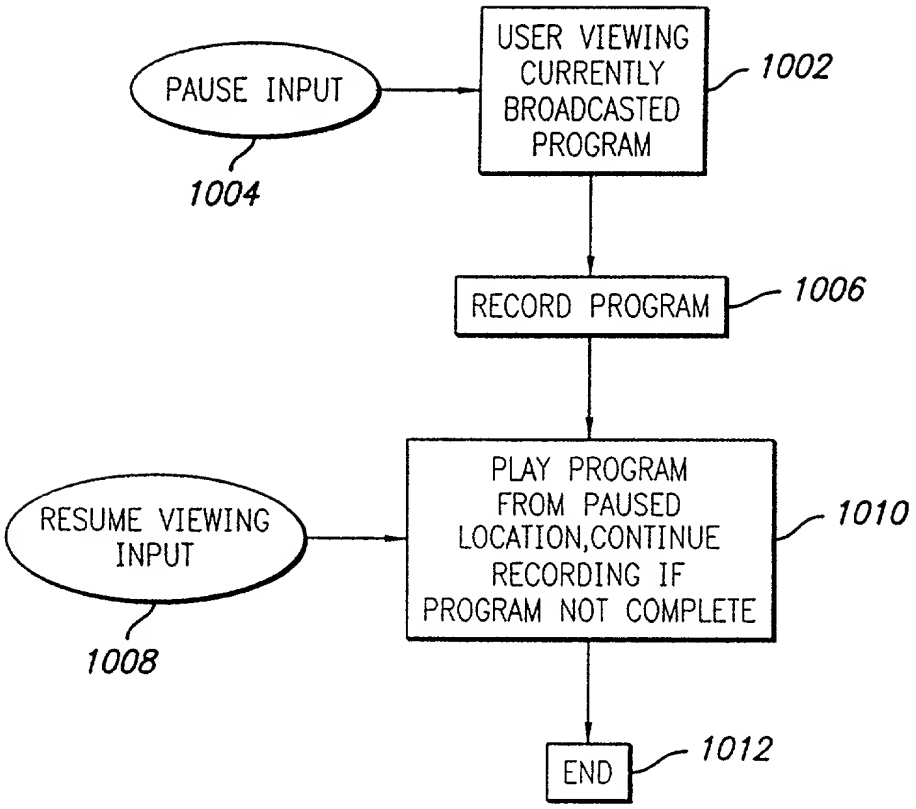

USER VIEWING CURRENTLY BROADCASTED PROGRAM
1002
PAUSE INPUT
1004
RECORD PROGRAM
1006
PLAY PROGRAM FROM PAUSED LOCATION,CONTINUE RECORDING IF PROGRAM NOT COMPLETE
1010
RESUME VIEWING INPUT
1008
END
1012

FIG. 27

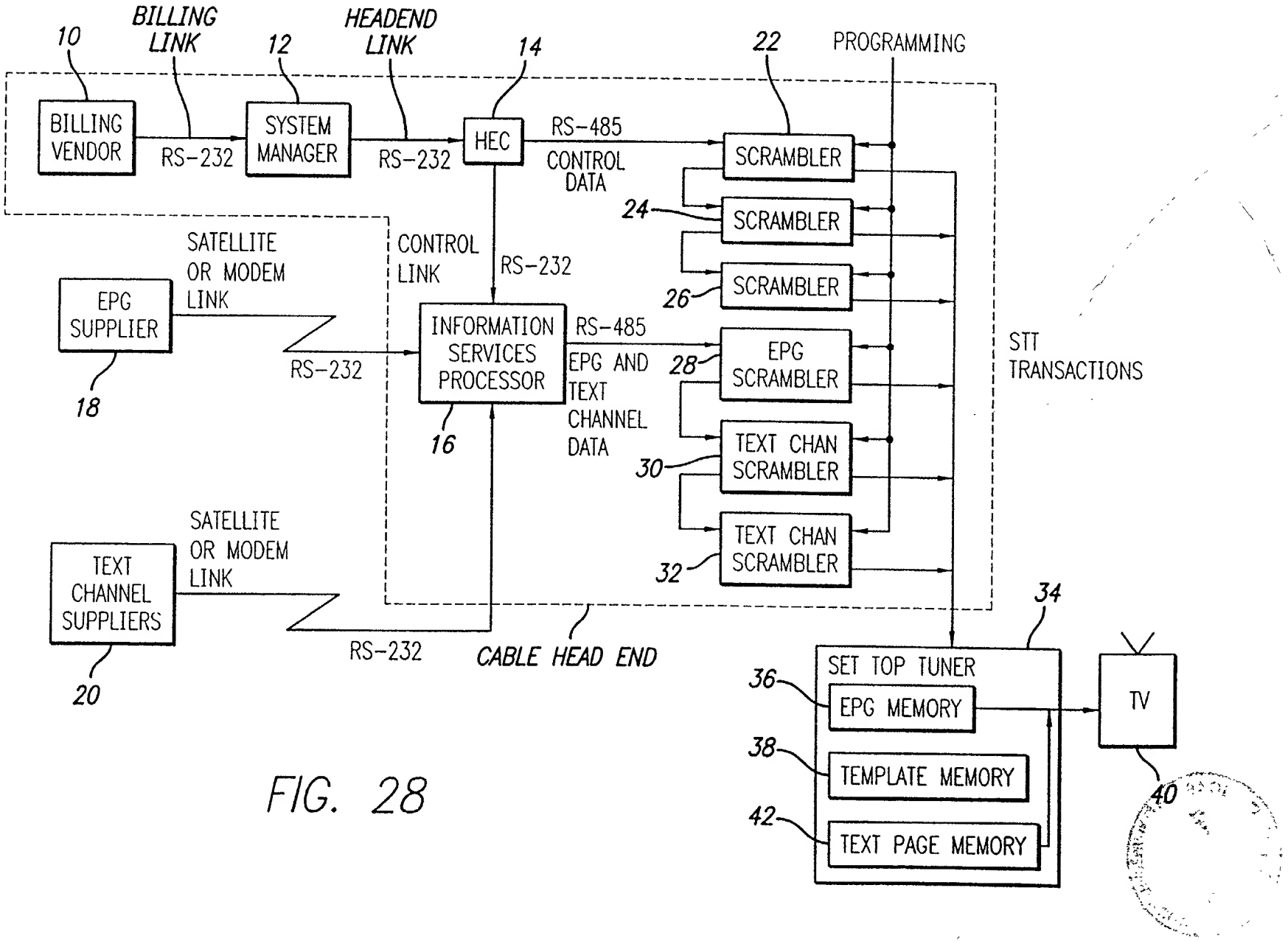
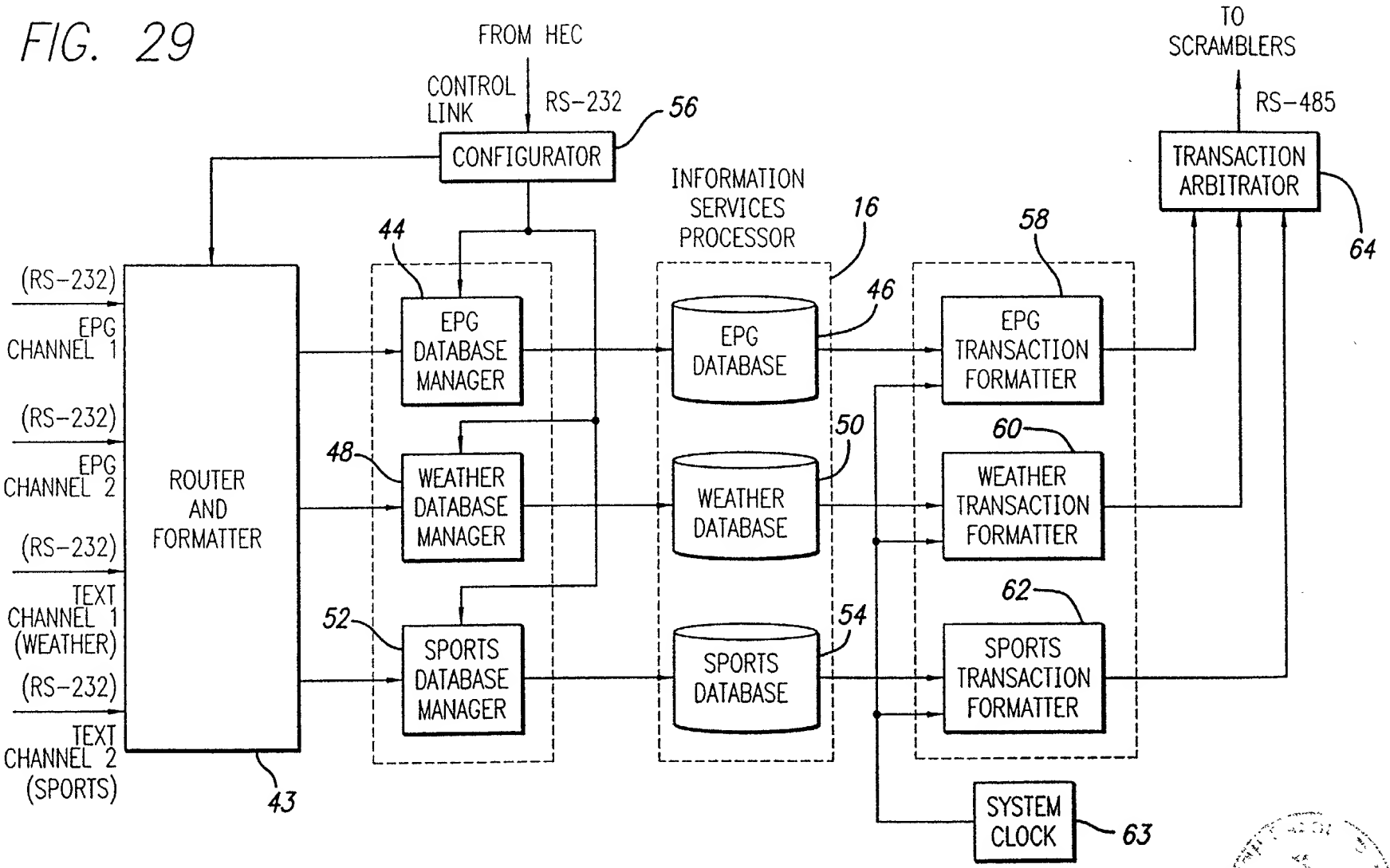

10
BILLING LINK
12
HEADEND LINK
14
22
PROGRAMMING
BILLING VENDOR
RS-232
SYSTEM MANAGER
RS-232
HEC
RS-485
CONTROL DATA
SCRAMBLER
24
SCRAMBLER
26
SCRAMBLER
SATELLITE OR MODEM LINK
CONTROL LINK
RS-232
EPG SUPPLIER
18
RS-232
INFORMATION SERVICES PROCESSOR
16
RS-485
EPG AND TEXT CHANNEL DATA
28
EPG SCRAMBLER
30
TEXT CHAN SCRAMBLER
32
TEXT CHAN SCRAMBLER
STT TRANSACTIONS
SATELLITE OR MODEM LINK
TEXT CHANNEL SUPPLIERS
20
RS-232
CABLE HEAD END
34
SET TOP TUNER
36
EPG MEMORY
38
TEMPLATE MEMORY
42
TEXT PAGE MEMORY
TV
40

FIG. 28

FIG. 29


FROM HEC
CONTROL LINK
RS-232
56
CONFIGURATOR
TO SCRAMBLERS
RS-485
TRANSACTION ARBITRATOR
64
INFORMATION SERVICES PROCESSOR
16
44
58
(RS-232)
EPG CHANNEL 1
(RS-232)
EPG CHANNEL 2
(RS-232)
TEXT CHANNEL 1 (WEATHER)
(RS-232)
TEXT CHANNEL 2 (SPORTS)
ROUTER AND FORMATTER
43
EPG DATABASE MANAGER
WEATHER DATABASE MANAGER
SPORTS DATABASE MANAGER
48
52
EPG DATABASE
WEATHER DATABASE
SPORTS DATABASE
46
50
54
EPG TRANSACTION FORMATTER
WEATHER TRANSACTION FORMATTER
SPORTS TRANSACTION FORMATTER
60
62
SYSTEM CLOCK
63

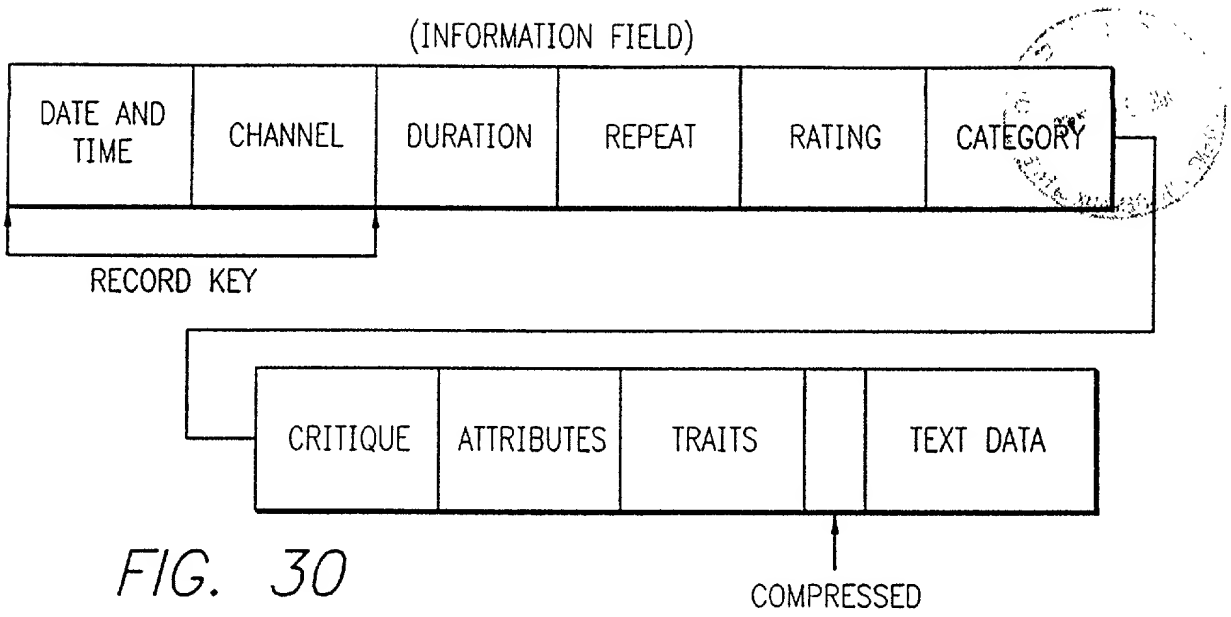


FIG. 30

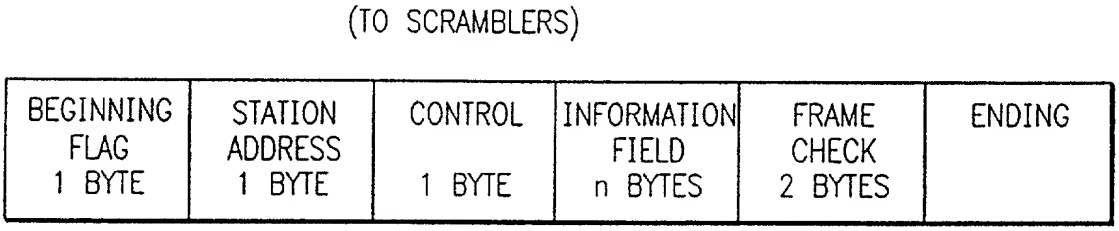


FIG. 31

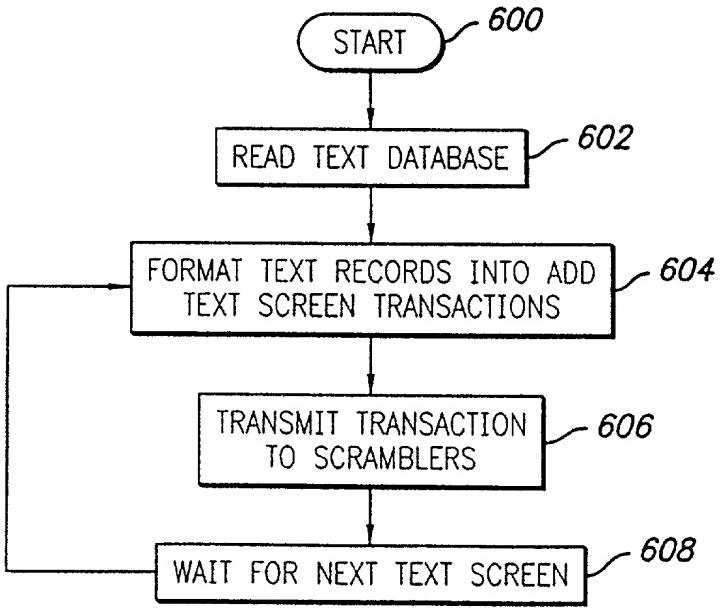
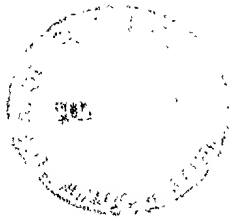


FIG. 33

20060705225660



EPG TRANSACTION FORMATTER 58

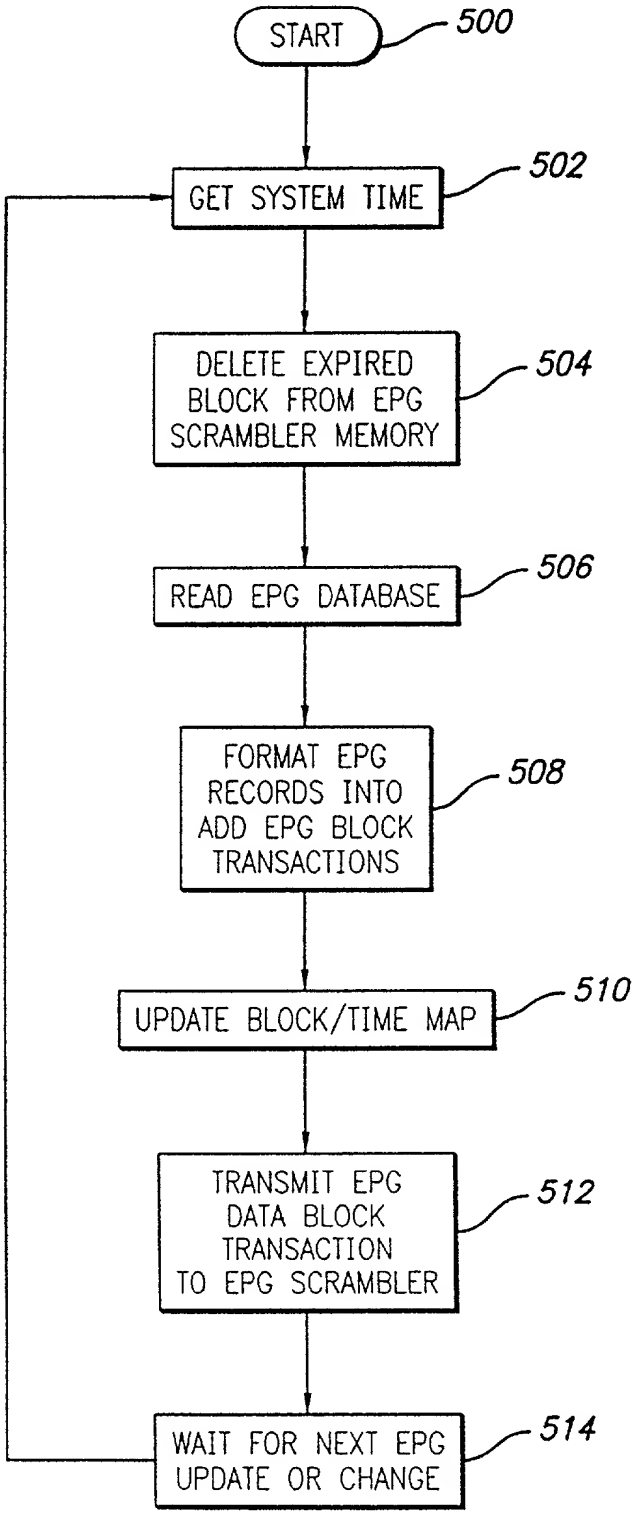


FIG. 32

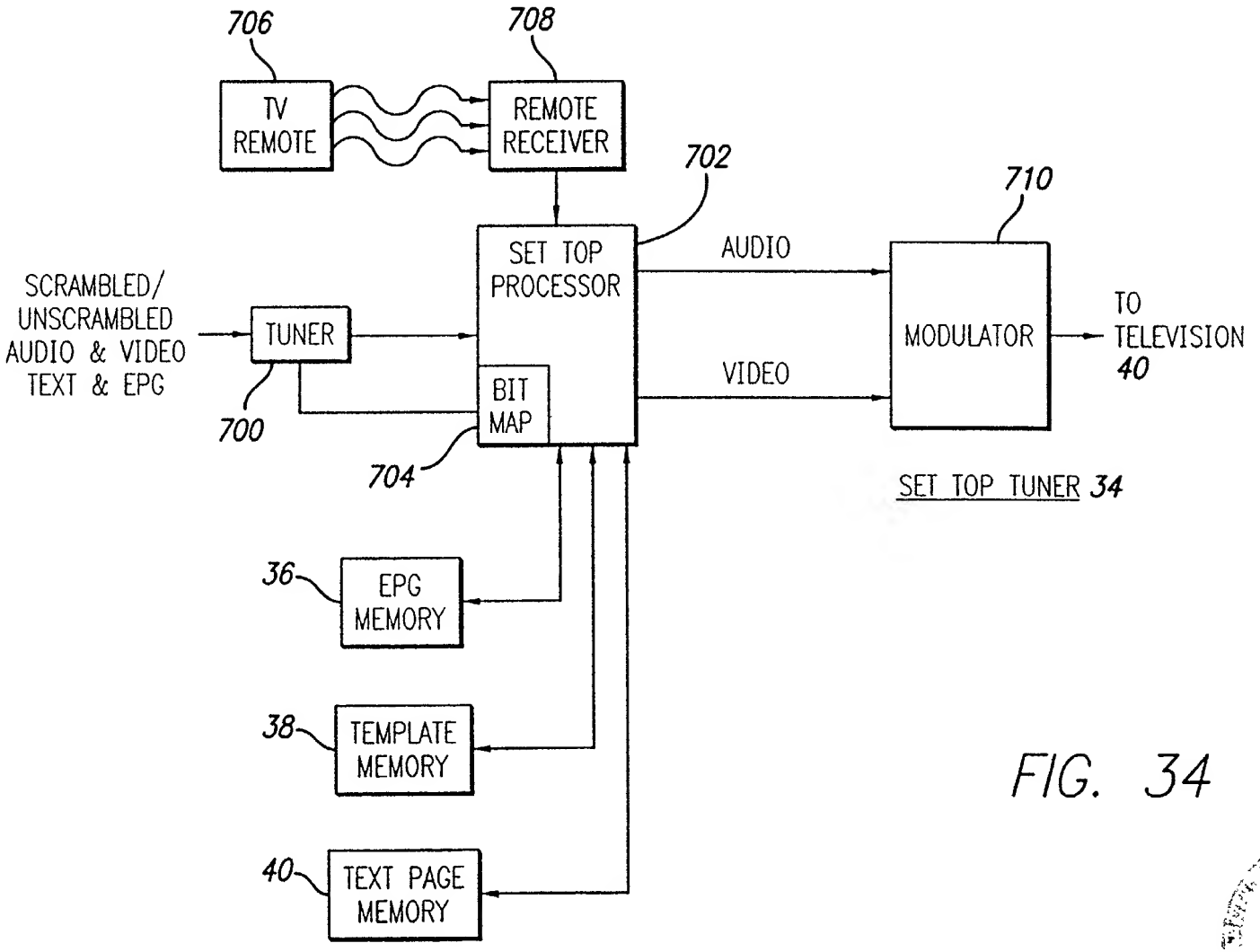

706
708
TV REMOTE
REMOTE RECEIVER
702
710
SET TOP PROCESSOR
AUDIO
SCRAMBLED/ UNSCRAMBLED AUDIO & VIDEO TEXT & EPG
TUNER
MODULATOR
TO TELEVISION 40
VIDEO
BIT MAP
700
704
SET TOP TUNER 34
36
EPG MEMORY
38
TEMPLATE MEMORY
40
TEXT PAGE MEMORY

FIG. 34

20060230 5E25050

PROCESS FOR AUTOMATICALLY CREATING MULTIPLE PROFILES AND AUTOMATICALLY IDENTIFYING CURRENTLY ACTIVE PROFILES

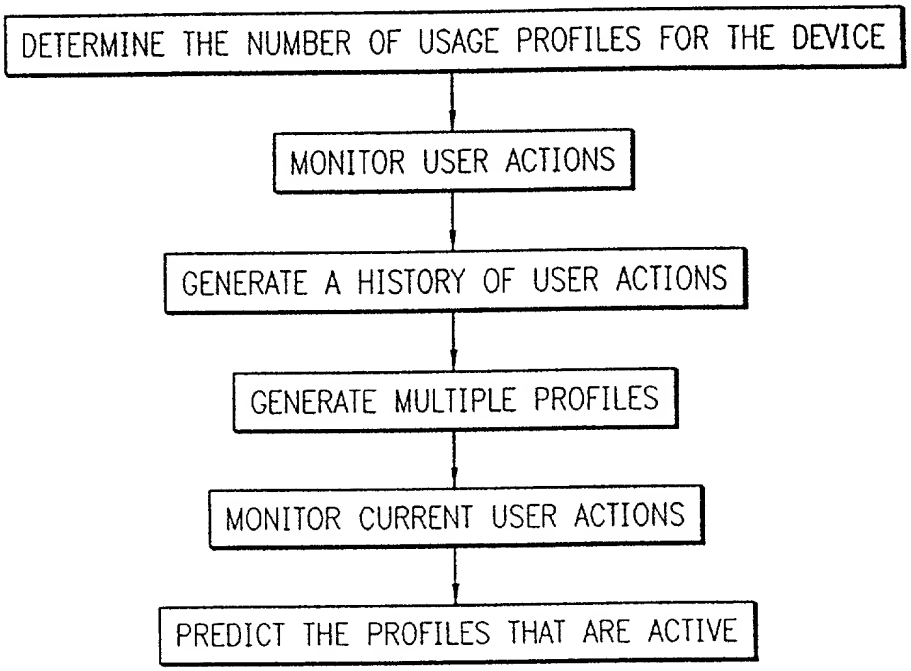


FIG. 35

2050270 - 5EE5060

CIRCULAR PROGRAM GUIDE

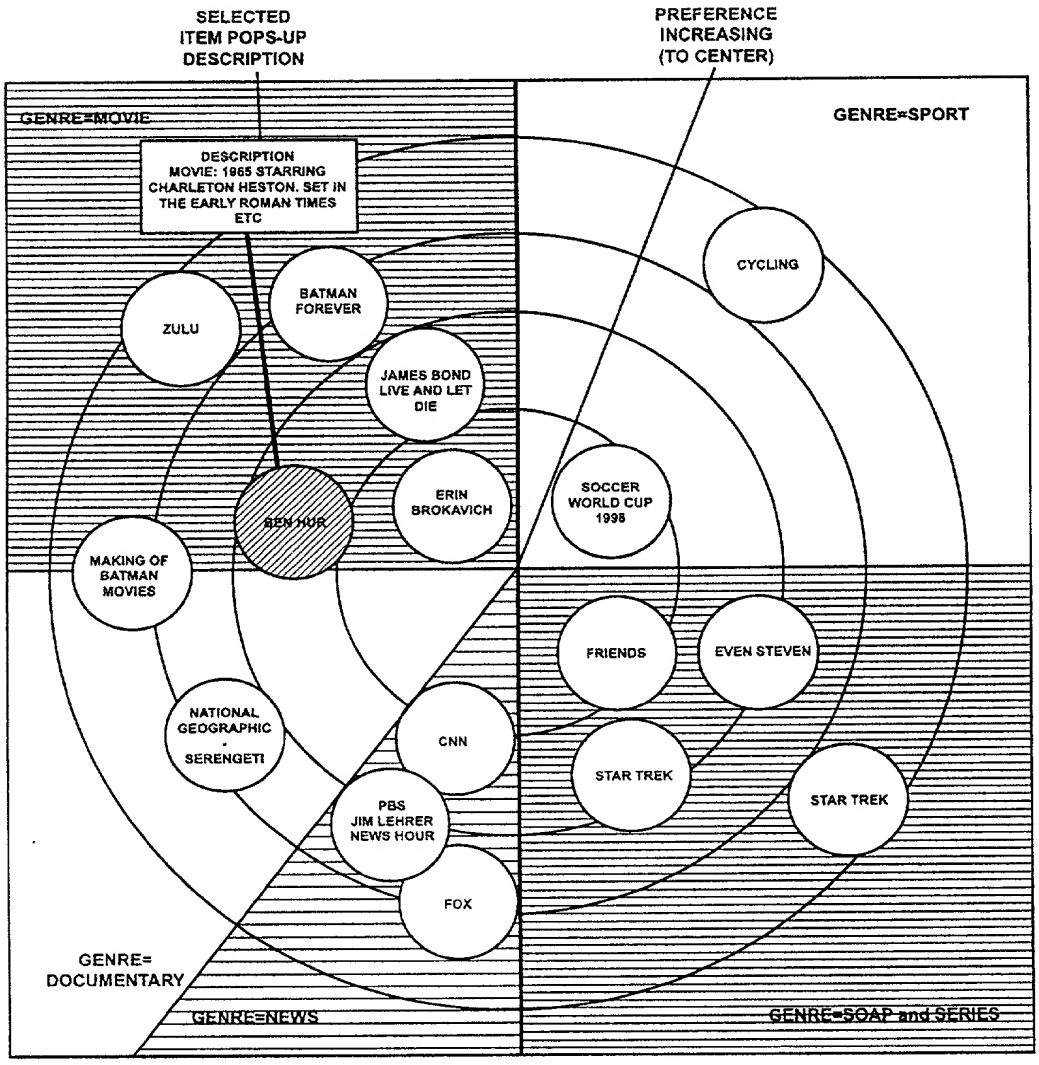


FIG. 36